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NSPS Subpart QQQ Review and Audit Report

BP Husky – Toledo Refinery

20 April 2020

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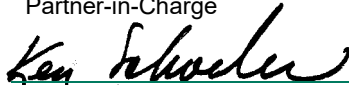
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BP Husky – Toledo Refinery



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1. INTRODUCTION

Environmental Resources Management (ERM) was retained by BP-Husky Refining, LLC (BPH) to complete a compliance audit of the New Source Performance Standards (NSPS) Subpart QQQ program at the Toledo, Ohio refinery to supplement a previous Subpart QQQ applicability assessment at the refinery [“Toledo NSPS Subpart QQQ Applicability and MOC Process Review”. September 2015, Sage Environmental Consultants].

The September 2015 Subpart QQQ applicability review and this (December, 2019) compliance audit satisfy portions of the EPA Consent Decree (CD) Addendum provisions C.29 through 36 (NSPS Subpart QQQ Audit and Corrective Actions), which BPH and EPA are currently negotiating.

ERM staff conducted the on-site portion of the NSPS Subpart QQQ applicability and compliance audit at the Toledo Refinery during the week of July 14, 2019, as well as associated follow-up activities leading up to this report.

1.1 Background of Consent Decree

NSPS Subpart QQQ (40 CFR §§60.690-60.699) is entitled “*Standards of Performance for New Stationary Sources: VOC Emissions for Petroleum Refinery Wastewater Systems*”. It includes standards of design, operation, recordkeeping and reporting for various equipment in refinery wastewater conveyance and pretreatment service (e.g., drain hubs, junction boxes, lift stations, oil water separators and slop oil tanks). The rule applies to equipment that was constructed, modified or reconstructed after May 4, 1987.

BPH is finalizing a CD with the U.S. Environmental Protection Agency (EPA) and the State of Ohio. Among the many requirements of the CD, Provisions C.29-36 require BPH to conduct and complete a QQQ Audit for the Toledo Refinery’s compliance with NSPS Subpart QQQ by the later of September 30, 2019 or 30 days after the Effective Date of the CD. As of November 8, 2019, the CD had not been executed by the Ohio EPA, so an effective date has not been triggered. Per Provision C.29, the Subpart QQQ Audit will review the following subjects:

- a. Subpart QQQ Applicability - for all projects that changed or potentially changed either the storm water or the process wastewater collection systems since November 1, 2014.
- b. Subpart QQQ Controls - evaluate all affected facilities currently subject to NSPS Subpart QQQ (or facilities which BPH has elected to accept Subpart QQQ applicability) to ensure that they are controlled in accordance with NSPS Subpart QQQ standards.
- c. Management of Change – evaluate BPH’s management of change (MOC) process to ensure that it is both appropriately designed and implemented to:
 - i. Identify any construction, modification, or reconstructions of wastewater conveyance or oil water separator equipment that is subject to NSPS Subpart QQQ standards, and if so, specify the NSPS Subpart QQQ control requirements for the affected facility.
 - ii. Identify any changes to the scope of any construction, modification or reconstruction project after the initial MOC review to determine whether those changes will affect the applicability or scope of the project in relation to NSPS Subpart QQQ, and if so, specify the NSPS Subpart QQQ control requirements for the affected facility.

This NSPS Subpart QQQ Review and Audit Report by ERM covers the CD Provision C.29 requirements.

Per Provision C. 32 and 33 of the CD, a final QQQ Audit Report detailing the findings and conclusions of the QQQ Audit shall be prepared by BPH and submitted to the EPA within 90 days of completing the QQQ Audit (the “QQQ Audit Report”). The QQQ Audit Report shall:

- I. Describe the processes, procedures and methodology used to conduct the Subpart QQQ Audit.
- II. Clearly identify any violations or potential violations of NSPS Subpart QQQ noted in the course of the Subpart QQQ Audit.
- III. Identify all facilities or equipment for which NSPS Subpart QQQ applicability was accepted in lieu of auditing NSPS Subpart QQQ applicability.
- IV. Provide details concerning the costs associated with such corrective actions(s) and economic benefit(s) obtained by BPH, including equipment included in item III above.
- V. Include a corrective action plan and implementation schedule specifying all projects necessary to bring the applicable parts of the refinery into compliance with NSPS Subpart QQQ. If further work is required to determine the appropriate corrective action, the Subpart QQQ Audit Report shall include an explanation of the additional work and proposed schedule for completing the additional work and the chosen corrective action. This corrective action plan and implementation schedule is subject to EPA comment.

1.2 Scope and Objectives

The scope of this project encompassed the Toledo Refinery's wastewater collection system and review of projects from November 1, 2014 to the present. The objective was to conduct a Subpart QQQ audit of the Toledo Refinery's wastewater system according to Provision C.29 of the CD and provide a basis for BPH to submit a QQQ Audit Report to the EPA.

1.3 Processes, Procedures, and Methodologies

For this audit evaluation, ERM reviewed the Toledo Refinery operations through applicability analyses, visual inspections of affected equipment, visual observations of various inspection procedures, examinations of process and equipment drawings, interviews with experienced refinery staff, and reviews of records for periods from November 1, 2014 to the present (July 15, 2019).

To understand the basis of the refinery's established QQQ program and oily water collection system, ERM interviewed a number of BP employees and contractors familiar with those units currently in the refinery's Subpart QQQ program. These individuals were:

1. Steve Hoyt, Environmental Specialist –Water;
2. Ken Comey, Director of Regulatory Affairs and Compliance;
3. John Wigger, Senior Environmental Compliance Advisor (ECAT); and
4. Joey Mathias – Subpart QQQ inspection contractor.

BPH provided ERM a list of 23 projects that potentially impacted the refinery wastewater collection network since November 1, 2014. These records included the following technical reports and previous Subpart QQQ assessments prepared by BPH or its consultant:

- *Toledo NSPS Subpart QQQ Applicability and MOC Process Review*, Sage Environmental Consulting, September 2015

- *Permit to Install (PTI) Applications and Project Files*, Project descriptions, drawings and Applications submitted to the State of Ohio EPA, Division of Surface Water. These PTI applications are required for BPH to obtain authorization from Ohio EPA to construct sewer modifications at the refinery.
- *Preliminary NSPS Subpart QQQ Applicability Review*, Project scope, description, drawings and findings for projects included in the Sage Audit (pre- November 2014). Prepared by William Rupert of BP.
- *Subpart QQQ Components Master Compliance Status List*
- *Semi-annual Reports*
- *Inspection Log Sheets*
- *BWON Carbon Canister Log Sheets*
- *Notifications – TFO QQQ Certification (5/11/18), TFO Anticipated Startup Date (2/12/18), TFO Anticipated Startup Date (5/23/18), Crude Unit Desalters Startup (10/23/18)*

These available records and technical reports provided details of the 23 projects. The project documents and field inspections reviewed by ERM provided sufficient records to evaluate whether or not construction, modification, or reconstruction of a NSPS Subpart QQQ “affected facility” occurred. The project records included:

- Permit-to-Install application submitted to Ohio EPA, Division of Surface Water;
- Project description (including sewer components, drains, junction boxes, lift stations and oil water separators added or changed); and
- Reference drawings.

The list of 23 projects evaluated by ERM are shown in Table 1-1.

Table 1-1: Projects Evaluated by ERM

ERM #	Date	PTI #	Unit/Project Area
II-1	23-Jan-13	918792	BGOT Recycle Gas Compressor
II-2	16-Jul-14	985674	Flare Gas Recovery and Treating Project Process and Storm Water Sewers
II-3	30-Oct-14	1003051	Subpart Ja West Flare Project - Drum Replacement and Sewer Installation.
II-4	22-Jan-15	1029739	Coker 2 South Charge Pump Sewers
II-5	22-Jul-15	1045305	Driftmeyer Ditch Storm Water Mitigation
II-6	10-Aug-15	1046480	Cooling Tower #1 Chemical Addition System
II-7	11-Sep-15	1054419	Fresh Acid Tank Replacement
II-8	8-Aug-16	1095223	Maintenance Shop Complex Sanitary Sewers
II-9	8-Aug-16	1095170	Maintenance Shop Complex
II-10	15-Aug-16	1098127	Toledo Feedstock Optimization (TFO) Project
II-11	3-Jan-17	1128979	Maintenance Shop Complex
II-12	26-Jun-17	1155498	Catch Basin Installation for PSV 3025 Discharge.
II-13	18-Jul-17	1157122	TFO sewer revisions to two of the 11 sewer projects covered in project II-10.
II-14	11-Oct-17	1167454	Once Thru Water Tempering
II-15	6-Dec-17	1200612	Sump 1 Offloading - Offloading Truck Connection and Containment Slab

ERM #	Date	PTI #	Unit/Project Area
II-16	14-Dec-17	1200613	Alky1 Caustic Storage and Track 10 upgrades
II-17	17-Jan-18	1209567	Sat 7 UPS Replacement Project Sewer Installation
II-18	22-May-18	1226379	East Flare KO Drum Pumps Sewer Installation
II-19	10-Jul-18	1230234	H2 Plant Feed Gas Contactor Replacement
II-20	8-Jun-18	1231567	New Praxair Nitrogen Plant
II-21	5/24/2018	1226385	WWTU Flocculators
II-22	5/9/2018	1224813	WWTU 18" Sewer Reroute
II-23	future	future	WWTU RAS/WAS/Mud Well Chemical Injection Upgrades

ERM reviewed previous engineering assessments of the sewer changes, sewer system design drawings, and/or conducted field observations to identify the new sewer equipment that was added as a result of each of the 23 projects and identified the adjacent and downstream drain system configuration. For each project identified by the above methods, ERM performed an applicability assessment using the audit methodology summarized in decision diagrams DD-1 and DD-2, provided in Appendix A.

The ERM compliance team also performed a compliance evaluation for equipment included in the existing Subpart QQQ program at the refinery. The documented observations and findings from prior audits were reviewed and considered as part of the evaluation. The compliance evaluation included field inspections and records review (where appropriate). In particular, ERM audited for water seals in drains, manhole covers, vent pipes on junction boxes, and tank vapor controls. ERM visually inspected a subset of equipment to achieve a confidence interval of approximately 90% or greater to ensure the observations were representative of the entire population of sewer components. Records review was conducted on the monthly and semiannual inspection logs, semiannual reports, and design drawings and specifications.

1.4 Limitations

ERM is not licensed to practice law in the State of Ohio. This assessment represents ERM's professional interpretation and judgment of existing conditions based on review of available drawings, records, field inspections and verbal interviews with site personnel. It is ERM's specific intent that the findings presented herein be used as guidance. ERM makes no warranties, expressed or implied. Regulatory interpretation given hereunder is provided by a technical person rather than by an attorney-at-law. If legal advice is desired, consult a licensed attorney.

2. BACKGROUND

2.1 Refinery History

BP-Husky's Toledo Refinery (the refinery), located in Toledo, Ohio on 586 acres east of the city, has operated continuously since 1919. Since that time, the refinery has undergone numerous improvements and expansions to achieve its current capacity for processing 160,000 barrels of crude oil daily and produces all grades of unleaded gasoline, jet fuels, kerosene, diesel fuel, low sulfur diesel, petroleum coke, asphalt, liquid propane gas (LPG), propylene, heating oils, gas oil, decanted oil, and molten sulfur. The industrial processes at the facility include atmospheric crude distillation, vacuum crude distillation, fluid catalytic cracking, continuous catalytic reforming, naphtha treating unit, diesel/gas oil hydrotreating unit, petroleum coking unit, isocracking unit, and sulfuric acid alkylation.

BP-Husky Refining LLC (BPH) discharges effluent waters to Maumee Bay under a NPDES permit number 2IG00007*KD issued by OHIO EPA. The discharge from the refinery process wastewater treatment unit is comingled with once-through cooling water prior to discharge through permit-designated outfall 002.

2.2 Wastewater Collection System

The refinery has an extensive network of underground sewers to convey refinery process wastewater and storm water runoff to the centralized wastewater treatment unit (WWTU). In compliance with EPA BWON rule, 40 CFR Part 63 Subpart FF, there are dedicated wastewater streams hard piped or taken by vacuum trucks to the Benzene Stripper system. The effluent from the Benzene Stripper is discharged to the refinery oily water sewer system. Refinery process wastewater sewers and their individual drains systems are subject to Subpart QQQ rule if it is determined by BPH that a Subpart QQQ-affected facility was constructed, modified or reconstructed after May 4, 1987.

The refinery has a combined sewer system. All of BPH's process wastewaters, as well as cooling tower blowdown, some sanitary wastewater, storm water runoff, and wastewater from an adjacent company, Chemtrade, Inc., is processed in the wastewater treatment unit (WWTU). An overall refinery flow and the WWTU Flow Diagram are presented as Figure 2-1 and 2-2, respectively. Once through (non-contact) cooling water from Maumee Bay is treated to remove grit and sediment and piped separately throughout the refinery for process cooling purposes. Once through cooling water outfall #602 is combined with WWTU effluent outfall #601 and discharged through NPDES outfall #002 to Maumee Bay.

If the flow in the sewer leading to the WWTU exceeds 6,000 gallons per minute (gpm) due to excessive storm water runoff, or when WWTU is experiencing treatment process upsets, wastewater is diverted to two 8-million gallon storm water storage tanks, Tanks 26 and 27. The storm water diversion chamber, JB25, has gate valves to direct flow from the 84-inch sewer into the chamber. Another series of gate valves can direct flow from the diversion chamber by gravity to storm water storage Tanks 26 and 27.

If Tanks 26 and 27 become full, wastewater can overflow into the south impoundment basin (South Pond), which has a capacity of 7 million gallons. According to BPH, overflow into the south impoundment is an extremely rare event and has happened two times in the past five years (June 27, 2015 and April 20, 2019) due to an extreme rainfall event and an upset of the WWTU. On these two occasions, the flow into the south impoundment met the 40 CFR 60.51 (c) definition of a drain system *malfunction* (it was sudden, infrequent, and not reasonably preventable) and did not constitute a non-compliance with NSPS Subpart QQQ standards as allowed in 40 CFR 60.692-1(a). Documentation that these two malfunction events were included in the respective QQQ semi-annual reports (required by 40 CFR 698 (c) as "other problems that could result in VOC emissions") was not available for review.

Accumulated wastewater from Tanks 26 and 27 is eventually pumped back into the main trunk sewer for treatment in the refinery's oil water separator and WWTU. On the rare occasion that overflow water is collected in the South Pond, it is also pumped back to the oil water separator inlet channel and treated in the refinery WWTU.

Wastewater processed by the WWTU first flows into two primary API separator channels (Wastewater Inlet Channel and a series of API Separator Bays) as shown in a simplified wastewater and slop oil process flow diagram in Figure 2-3. Oil is skimmed from the surface and solids settle to the bottom.

The API separator bays are used to further enhance oil-water separation and sludge settling. Oil recovered from the Inlet Channel and the oil-water separator bays is pumped to the WWTU's Slop Oil Storage Tanks 79 and 697. The separated oil is returned to the process and temporarily stored in the Heavy Crack Slop Oil Tanks (process tanks 776 and 777) to be burned or reprocessed in the refinery.

Process wastewater effluent from the API separator bays is next treated in the dissolved air flotation unit to further reduce oil and suspended solids. Water exiting the dissolved air flotation unit is pumped to a pond equipped with floating mechanical aerators to undergo further treatment through an activated sludge biological process. A secondary clarifier settles bio-solids for recycle to the aeration pond. Effluent from the secondary clarifier can be sent through sand filters as a final treatment polishing step. Sludge produced from the various treatment operations in the WWTU is processed with a sludge thickener and a belt press. Dewatered sludge produced from biological treatment is disposed of in a landfill.

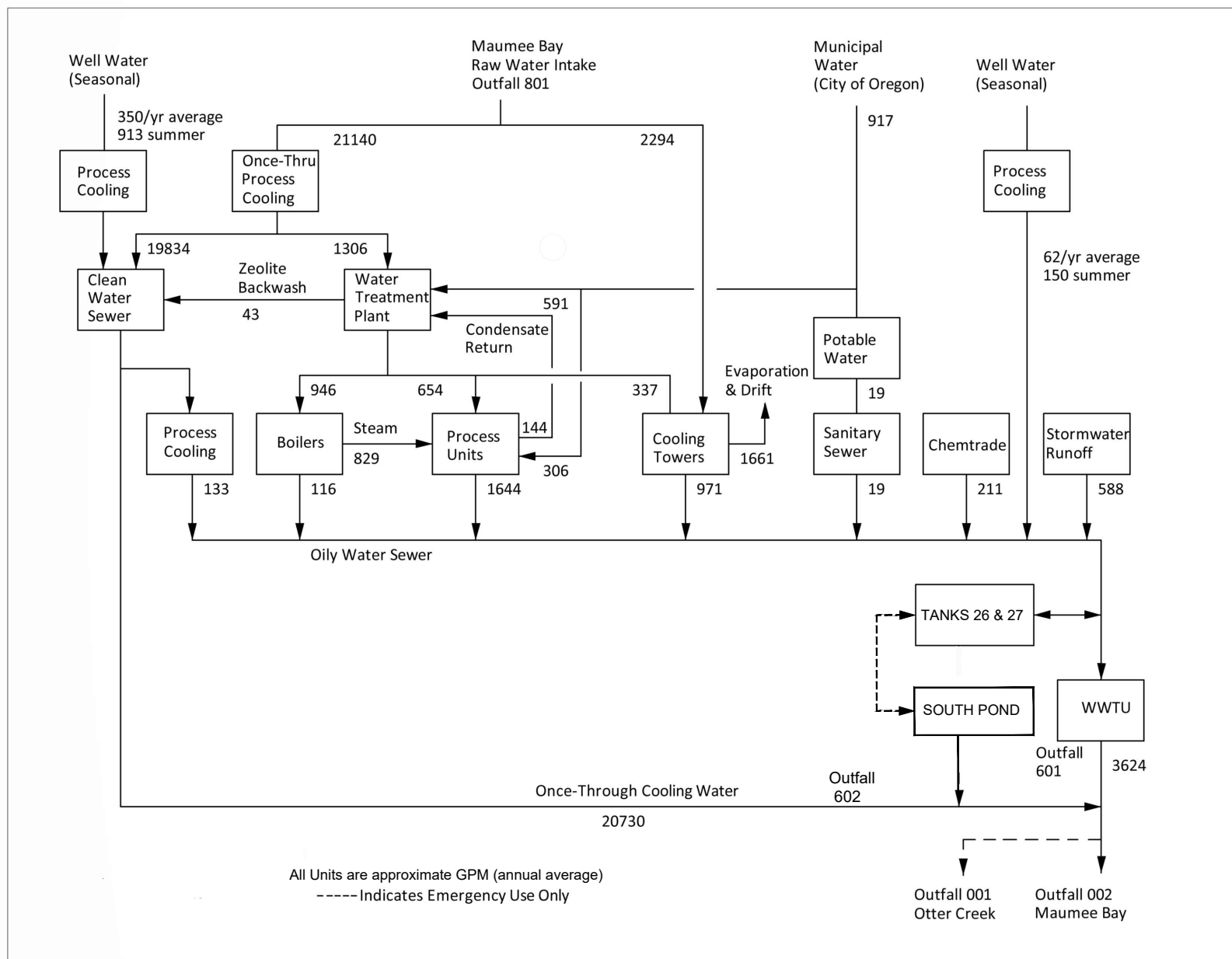


Figure 2-1
Refinery Flow Balance
 NSPS Subpart QQQ Audit
 BP Husky LLC - Toledo Refinery
 Toledo, Ohio

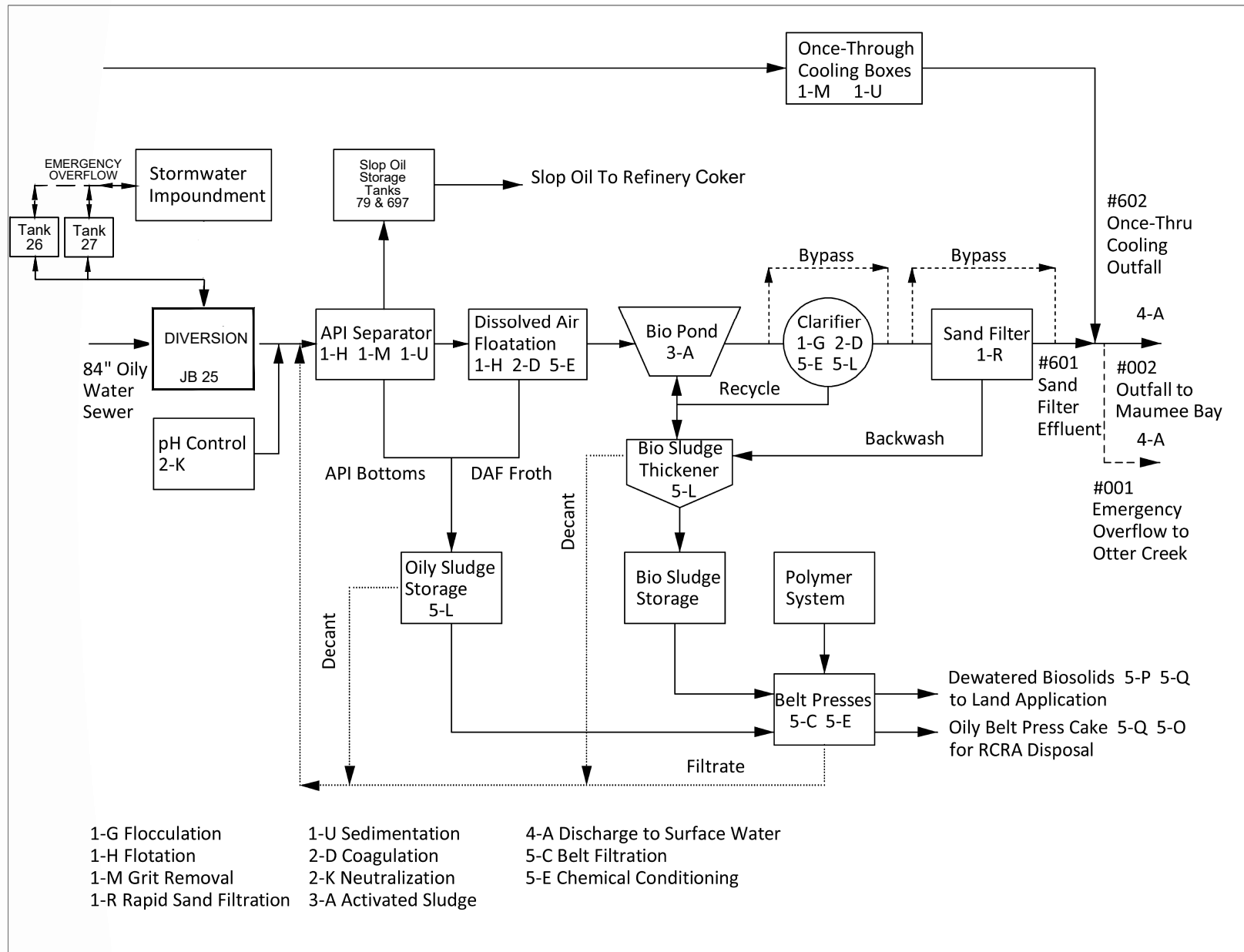
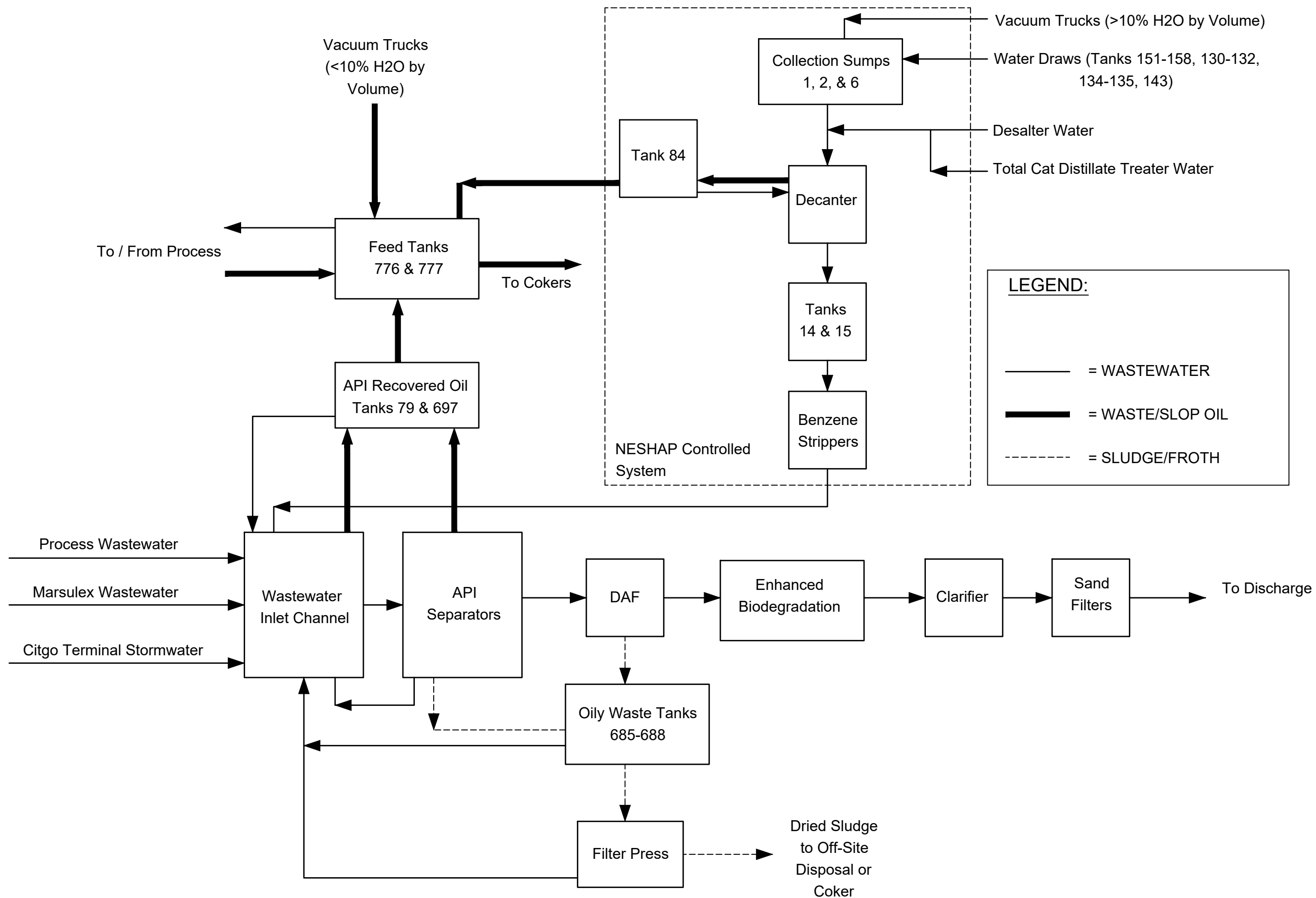


Figure 2-2
WWTU Flow Diagram

NSPS Subpart QQQ Audit
BP Husky LLC - Toledo Refinery
Toledo, Ohio



From: BPH Simplified Waste End-of-Line
sampling location Diagram (May 16, 2002)

Figure 2-3
End-of-Line and Waste
Flow Diagram
NSPS Subpart QQQ Audit
BP Husky LLC - Toledo Refinery
Toledo, Ohio

3. SUBPART QQQ APPLICABILITY ASSESSMENT

Over the course the audit, ERM performed a detailed review of 23 of projects, identified by BPH, to determine whether or not changes to the sewer system were made and, if so, if the changes met the NSPS definition of a construction, reconstruction, or modification, thereby triggering Subpart QQQ applicability.

Also included in this report section is ERM's evaluation of selected projects from the September 15, 2015 Subpart QQQ Applicability report. The objective of ERM's evaluation was to confirm, for negative applicability determinations in the 2015 report, that the methodology used was consistent and similar to the methodologies used in this audit report.

3.1 Areas Previously Identified as Subpart QQQ-Applicable

The refinery's current QQQ management program includes a number of QQQ affected components. BPH has produced color-coded sewer maps showing sewers that are considered applicable to NSPS Subpart QQQ. These sewer maps are provided in Figures C-1 through C-4 in Appendix C. As of July 2019, 1267 components are included in the refinery's QQQ inspection program, consisting of the following approximate breakdown:

- 37% drain hubs;
- 24% clean-outs;
- 18% junction boxes;
- 10% catch basins; and
- 11% other items (vent pipes, oil-water separator and slop oil tank seals, etc.).

3.2 Subpart QQQ Applicability Review - November 2014 to July 2019 Projects

BPH provided ERM a list of 23 projects that potentially impacted the refinery wastewater collection network since November 1, 2014. These projects were triggered for ERM review because BPH submitted application form EPA 4309 to the Ohio EPA, Department of Surface Water for sewer or wastewater construction activities. Application form EPA 4309 (and supporting drawings and engineering documents) are required by the Ohio EPA to obtain a "Permit-to-Install" for any sewer changes or wastewater treatment unit changes prior to construction. As part of ERM's applicability assessment, ERM reviewed BPH's permit-to-install application materials, engineering documents, sewer system design drawings, and/or conducted field observations to identify the new sewer equipment that was added as a result of the changes. BPH's list identified 23 projects associated with 23 different Permit-to-Install applications. Several of the 23 permit-to-install applications included more than one area of the refinery. For ERM's applicability assessment, the original list of 23 permit-to-install packages resulted in 36 separate sewer projects. The results of the ERM applicability analysis are shown in Table B-1 in Appendix B.

A summary of the ERM applicability evaluation resulted in the following determinations:

- 36 – Total projects (since November 2014) were evaluated
 - 20 - Projects did not trigger Subpart QQQ applicability
 - Sewer components from two projects (Project II-2 and II-7) are in the Subpart QQQ inspection/monitoring program and can likely be removed from further Subpart QQQ compliance obligations as IDS 2-1 of Project II-2, meets the 40 CFR 60.692-1(d)(1) storm

water exemption and Project 11-7 (Fresh Acid Tank Replacement) added drains that do not manage VOC wastewater. Alternately, if BPH voluntarily elects to include IDS 2-1 in the QQQ management program, then the full boundaries of the affected facility (an additional 6 drain hubs and 2 area drains) need to also be added to the QQQ management program (see Figures B-2A and B-2B). No additional components need to be added to the QQQ program in the event BPH continues to voluntarily include Project II-7 components in the QQQ program (see Figures B-7A and B-7B).

- Three projects (IDS 2-3 of Project II-2, Project II-10.7 and project II-19) are in the refinery's Subpart QQQ inspection/monitoring program and can be subjected to the NSPS modification cost test (highly likely below 7% of original capital costs) and can be removed from further Subpart QQQ compliance obligations if the less than 7% cost threshold can be demonstrated. Alternately, if BPH voluntarily elects to include the following individual drain systems to the QQQ management program, then the full boundaries of the affected facility need to also be added to the QQQ management program as shown below.

Elected IDS	Current Components in QQQ management program	Additional components to add to QQQ program for full boundary of IDS if 7% cost threshold is not demonstrated	Reference Figures
IDS 2-3, Project II-2 (also includes components added as part of project II-19)	8 drain hubs and 5 clean outs	Approximately 16 drain hubs, 4 area drains, 3 catch basins and 9 clean outs	Figure B-2A and B-2B
IDS 10.7-1 Project II-10.7	2 drain hubs and 1 clean out	17 drain hubs, 2 surface drains, 2 catch basins and 1 manhole	Figure B-10.7A and B-10.7B

- 15 projects are appropriately not in the current Subpart QQQ compliance program.
- 16 – Projects triggered Subpart QQQ applicability (all 16 projects are in the current Subpart QQQ inspection and monitoring program)
 - All 16 projects are in the current Subpart QQQ inspection and monitoring program.
 - Four projects require that additional components be added to the boundaries of the affected facilities.
 - One project allows components to be removed from Subpart QQQ inspection monitoring because components currently monitored are not part of the affected facility.

Details of the above applicability analysis are included in Appendix B Table B-1 and the Figures B-1 through B-19.

3.3 ERM review of Selected Projects from the September, 2015 Applicability Report

ERM reviewed 26 projects that were determined “not applicable to NSPS Subpart QQQ” from the 2015 Applicability Report (Toledo NSPS Subpart QQQ Applicability and MOC Process Review, Sage Environmental Consulting, September 2015). ERM’s Subpart QQQ applicability determination contradicts the Sage Subpart QQQ applicability determination for one of those 26 projects (Project #4 – 1993 Benzene Stripper Installation Project).

In Section 3.4 of that report, one project of concern was noted as exempt per provisions §60.692-1(d) and §60.692-2(d) of the QQQ regulations. The text of those regulatory exemptions are provided below:

40 CFR §60.692-1(d), Standards: General

- (1) Storm water sewer systems are not subject to the requirements of this subpart.*
- (2) Ancillary equipment, which is physically separate from the wastewater system and does not come in contact with or store oily wastewater, is not subject to the requirements of this subpart.*
- (3) Non-contact cooling water systems are not subject to the requirements of this subpart.*

40 CFR §60.692-2, Standards: Individual Drain Systems

- (d) Except as provided in paragraph (e) of this section, each modified or reconstructed individual drain system that has a catch basin in the existing configuration prior to May 4, 1987 shall be exempt from the provisions of this section.*

The Sage report states that NSPS exemption §60.692-2(d) applies because the benzene stripper unit sewers tie into the pre-1987 sewers of the SRU unit that include catch basins downstream of the benzene stripper sewer systems installed in 1993. However, in the Benzene stripper sewer project, new drains were connected to new junction boxes (e.g., a “new individual drains system” per §60.690(b)). The construction of a *new individual drain system renders inapplicable the 40 CFR §60.692-2(d) exemption* claimed by Sage in the September 2015 Subpart QQQ Audit Report per 40 CFR §60.692-2(e), shown below:

40 CFR §60.692-2, Standards: Individual Drain Systems

- (e) Refinery wastewater routed through new process drains and a new first common downstream junction box, either as part of a new individual drain system or an existing individual drain system, shall not be routed through a downstream catch basin.*

See Appendix D, for drawings that were included in BPH’s “Preliminary NSPS QQQ Applicability Review – 1993 Benzene Stripper Installation Project” dated 1/26/2015 showing the changes that were made.

According to that analysis, a new individual drain system was installed, including three manholes, three catch basins, 12 process drains, five vent pipes and six cleanouts. However, the new installed sewer components are not identified on the Subpart QQQ sewer maps provided to ERM. This results in an audit finding.

New sewer components installed in the 1993 Benzene stripper installation and downstream manholes and catch basins need to be added to the Toledo Subpart QQQ management program. This will require verification and/or upgrade of the following components to meet Subpart QQQ design standards (see Figure D-1 and D-2 in Appendix D):

- three catch basins (CB-1, CB-2 and CB-3) installed as part of the project; and
- two downstream manholes and seven catch basins along the 20-inch sewer (which is a part of the SRU-1 sewer line).

A recommendation is to show the benzene stripper sewers (and all downstream manholes and catch basins) on the refinery's Subpart QQQ sewer map and add those components to the existing Subpart QQQ inspection, monitoring and reporting program.

4. SUBPART QQQ COMPLIANCE ASSESSMENT

4.1 Methodology

The scope of the compliance audit included a review of those process units and areas which ERM determined to be Subpart QQQ-affected during the concurrent applicability assessment.

The compliance audit consisted of two phases: field inspections and records review. ERM inspected a sample population of sewer system components (drain hubs, junction boxes, and overhead lines) at the refinery. During the field inspections, ERM examined a statistically significant subset of the NSPS Subpart QQQ-affected equipment to achieve a confidence interval of approximately 90% that the observations were representative of the entire population of sewer components (source: Inman, R.L. and Conover, W.J., *A Modern Approach to Statistics*, 1983, John Wiley & Sons, Inc., New York, NY; and Cochran, W.G., *Sampling Techniques, Second Edition*, 1963, John Wiley & Sons, Inc., New York, NY).

ERM auditors also examined process and equipment drawings, interviewed staff, and reviewed current and historical records to evaluate conformance with NSPS Subpart QQQ design standards.

4.2 QQQ Controls

ERM visually observed 67 drain hubs, catch basins and area drains for adequate water seals, and 56 manholes, junction boxes, and cleanouts for solid covers/tightly sealed status. The large sump near the surge tanks, and the fixed and floating covers on the L-shaped and secondary oil water separators lift stations and dike drain valves were also observed. The results of the review of the control status was that equipment was properly designed and installed, but in a few instances the controls were removed for convenience, hatches were left unlatched, and some holes had appeared in the manhole covers or plugs or gaskets were missing. According to BPH, the latches and observed manhole cover holes were remedied the week following the audit, within the 15-day repair period allowed under 40 CFR 60.692-2(b)(4).

4.3 Inspections, Recordkeeping and Corrective Actions

The documentation of inspections scheduled on a weekly, monthly or semi-annual basis over the last three years were reviewed. The inspection records are very well organized and complete, except the small sections of aboveground piping (i.e., unburied sewer) at the lift stations and the section of piping between the oil water separator and the slop oil tanks were not included on the inspection forms. When a corrective action was required, that information was recorded on the inspection log sheet.

The records of carbon canister breakthrough readings for the sump by Tanks 26 and 27 are maintained with the Benzene Waste NESHAP readings. Three weekly records were reviewed.

ERM accompanied the BPH Subpart QQQ Inspection Contractor during his routine inspection rounds of drains and manholes during portions of the audit. In the Reformer #3 unit and the East Tank Farm Area the water seal controls for some of the drains in active service were being checked for indications of low water level by inspecting the water level in adjacent manholes. ERM reviewed engineering drawings provided by BPH to assess the validity of this technique. The records provided ERM indicate that Reformer #3 unit has the following components:

- Manholes – 33
- Active Process Drains – 14 (all with water seal inserts, checked visually each month)
- Condensate Drains – 37

- Inactive and Plugged Drains – 8
- Safety Shower/Storm water Drains – 4

Water seal controls for the condensate drains in the Reformer #3 unit are checked by inspecting the water level in the manhole into which the condensate sewer laterals drains. The objective of this technique is to verify that the condensate drain lateral is submerged as it enters the manhole, providing a water seal control that meets QQQ standards for the lateral. However, according to records provided ERM, 19 manholes receive from one to 5 condensate drains each. For this technique to meet QQQ design standards, each condensate drain would need to have its own submerged lateral into the manhole. The information provided to ERM was not of sufficient detail to document this was the case. Therefore, additional documentation is needed to verify that the manhole water level measurement is a valid technique to demonstrate conformance with QQQ design standards for water seal controls.

The Subpart QQQ Components Master Compliance Status List (Master List) was provided to ERM. The Master List does not match the inspection logs used by the field inspector. In some cases, items on the Master List were not on the inspection log, since that equipment or component was no longer in place. In other cases, components listed on the inspection log were not on the Master List. As a good management practice, the Master List and inspection log sheets should be reconciled and reviewed on a routine basis.

Refer to Table 4-1 for the findings regarding inspections and recordkeeping.

4.4 Reporting and Notifications

The semi-annual reports for the past three years were reviewed. The semi-annual report format has been updated to more succinctly relay the required information on inspections conducted, corrective actions taken, and any gap seal inspections that were completed during the semi-annual period.

The notifications for start of construction, actual operation date and confirmation of the installation of the required control equipment, and completion of the initial inspection vary depending on whether the Subpart QQQ subject equipment is new or a modification to an existing system. The Subpart QQQ notifications do not exactly coincide with the Ohio air permit requirements for notification of the anticipated startup date, and not all Subpart QQQ installations/modifications require an air Permit-to-Install. However, all Subpart QQQ installations/modification do require a wastewater PTI.

A system for Subpart QQQ notifications should be devised for both the case where an air PTI is issued for the project and when an air PTI is not required, and to accommodate both new and modified components. Subpart QQQ applicability is noted in the management of change review and could be one trigger to set up a notification log and communication pathway for the start of construction notification. Addition of new or modified components to the inspection log sheets is captured by the management of change system, and thus the trigger to complete an initial inspection may also be a mechanism to confirm the proper startup notifications have been submitted. The number of months and sometimes years between request for approval of the modification to the water permit and the actual construction of the components add complexity to any tracking system. A log of QQQ triggering projects should be maintained and communications with the project team should be made as each project progresses, so that regardless of whether a NPDES permit PTI or air permit PTI is needed for the project, which may have additional notification requirements, the NSPS required construction and startup notifications, with the QQQ specific elements, will be consistently submitted by the dates due.

Refer to Table 4-1 for findings regarding reporting and notification.

4.5 Subpart QQQ Permitting

The air quality Permits-to-Install (PTI) obtained in the last three years were reviewed and Subpart QQQ was called out as an applicable requirement in the permit application as required. No findings were noted for permitting.

4.6 Findings

Findings from the Subpart QQQ audit are presented in Table 4-1. A recommended corrective action is included for each finding.

TABLE 4-1
QQQ Compliance Audit Findings
NSPS Subpart QQQ Review and Audit
BP Husky Toledo Refinery

Finding No.	Finding Type	Regulatory Citation	Basis	Finding	Recommended Corrective Action
1a	Regulatory	40 CFR 60.690(a)(1)	Subpart QQQ applies to affected facilities that are constructed, modified, or reconstructed after May 4 1987	Sewer components need to be added to four different QQQ affected facilities currently in the BPH QQQ management program so the full boundaries of the affected facilities are appropriately designated. See Table B-1: Project II-10.1 (add 2 manholes, verify "dry boxes" and safety shower drain have water seal). See Figures B-10.1A and B-10.1B; Project II-10.2 (add 3 drain hubs, verify safety shower drain has water seal); See Figures B-10.2A and B-10.2B. Project II-10.4 (add 1 manhole, 3 drain hubs and 1 area drain, verify "dry boxes" and safety shower drain have water seal.) See Figures B-10.4A & B Project II-18 (add 3 drain hubs and 1 area drain). See Figure B-19.	Add all components in the QQQ affected facilities to the QQQ Management program and verify compliant controls are in place. Provide EPA notification of added components.
1b	Regulatory	40 CFR 60.690(a)(1)	Subpart QQQ applies to affected facilities that are constructed, modified, or reconstructed after May 4 1987	Sewer components need to be added to two different QQQ affected facilities currently in the BPH QQQ management program so the full boundaries of the affected facilities are appropriately designated or modification cost tests need to be performed to document whether changes were significant enough to trigger the 7% NSPS modification cost threshold: See Table B-1: Project II-2, IDS 2-3 (if costs exceed 7%, add 16 drain hubs, 4 area drains, 3 catch basins and 9 clean outs to the affected facility). See Figures B-2A and B-2B. Project II-10.7 (if costs exceed 7%, add 17 drains, 2 surface drains, 2 catch basins and 1 manhole to the affected facility). See Figures 10.7A and 10.7B.	Perform NSPS modification cost test. If costs for new equipment are less than 7% of the cost basis of the original facility (including previously existing components connected to the first downstream manhole and all other downstream components to the oil-water separator) remove the respective, currently managed, IDS components from QQQ management program (IDS 2-3 currently has 8 drains and 5 clean outs. IDS 10.7-1 currently has 2 drain hubs and 1 clean out) . OR If costs exceed 7% of the facility cost basis, add components listed to the affected facility. Provide EPA notification of cost test results.
1c	Regulatory	40 CFR 60.690(a)(1)	Subpart QQQ applies to affected facilities that are constructed, modified, or reconstructed after May 4 1987	BPH inadvertently included three QQQ affected facilities in its QQQ management program that were never subject to QQQ applicability. See Table B-1: Project II-2, IDS 2-1. Project relocated one catch basin and added 1 new catch basin that collect stormwater and meet the 40 CFR 60.692-1(d)(1) stormwater exemption from QQQ applicability. See Figures B-2A and B-2B. Project II-2, IDS 2-2. The components downstream of the new manhole (4 drain hubs and 2 clean-outs) were inadvertently added to, and are not part of, the QQQ affected facility. See Figures B-2A and B-2B. Project II-7. Three new stormwater catch basins meet the 40 CFR 60.692-1(d)(1) stormwater exemption from QQQ applicability and three drain hubs that collect sulfuric acid pump pad drainage do not generate VOC emissions thereby meeting the 40 CFR 60.14 (a) exemption from NSPS QQQ applicability. See Figure B-7A and B-7B.	Remove the following current QQQ components from the BPH QQQ management program. Project II-2, IDS 2-1: Remove two catch basins. Project II-2, IDS 2-2: Remove 4 drain hubs and 2 clean outs. Project II-7: Remove 3 stormwater catch basins and 3 drain hubs. Provide EPA notification of the removed components.
1d	Regulatory	40 CFR 60.690(a)(1)	Subpart QQQ applies to affected facilities that are constructed, modified, or reconstructed after May 4 1987	One project previously determined non applicable to QQQ (2015 Applicability Assessment Report) was determined applicable in this audit. (1993 benzene stripper project). The boundaries of the affected facility will add approximately 14 drain hubs, 4 clean-outs, 10 catch basins and 5 manholes to the current QQQ management program.	Add all components in the QQQ affected facilities to the QQQ Management program and verify compliant controls are in place. Provide EPA notification of added components.

TABLE 4-1
QQQ Compliance Audit Findings
NSPS Subpart QQQ Review and Audit
BP Husky Toledo Refinery

Finding No.	Finding Type	Regulatory Citation	Basis	Finding	Recommended Corrective Action
2	Regulatory	40 CFR 60.692-2(a)(2)	Each drain in active service shall be checked by visual or physical inspection initially and monthly thereafter for indications of low water levels or other conditions that would reduce the effectiveness of the water seal controls	Documentation provided to verify monthly water level measurements taken at manholes in the Reformer #3 unit and the East Tank farm was insufficient to conclude that active drains had a sufficient water seal.	Locate additional drain system construction documentation or re-create a document to verify the claim that at a certain depth of water in the manhole ensures that the active drains have a water seal. OR Add water seals at approximately 35 condensate drains and 4 safety showers/stormwater drains in the Reformer #3 unit.
3	Regulatory	40 CFR 60.692-2(c)(2)	The portion of each unburied sewer line shall be visually inspected initially and semiannually thereafter for indication of cracks, gaps, or other problems that could result in VOC emissions. A record of the inspections must be maintained when a problem is identified that could result in VOC emissions. The 15-calendar day repair time frames apply.	The semiannual unburied sewer inspections were not documented. The inspection log sheets do not include a place to note inspection of the short lengths of above-ground piping (unburied sewer) at the lift stations, the overhead line from the oil-water separators to the slop oil tanks, and the line from the slop tanks back to the process area. The wastewater operator performs daily line walks and any leaks of the line to the slop tank would be noted and corrected. The line from the slop tank back to the process would be noted by personnel driving to the wastewater treatment plant.	Add the lift station above-ground piping and overhead line to and from the slop oil tanks to the inspection log sheets.
4	Regulatory	40 CFR 60.692-3(e)	Slop oil from an oil-water separator tank and oily wastewater from slop oil handling equipment shall be collected, stored, transported, recycled, reused, or disposed of in an enclosed system. Once slop oil is returned to the process unit or is disposed of, it is no longer within the scope of this subpart. Equipment used in handling slop oil shall be equipped with a fixed roof meeting the requirements of paragraph (a) of this section.	Drains from slop oil tanks 79 and 697 do not have a water seal.	Add water-sealed drains to service slop oil tanks 79 and 697. Add the drains to the QQQ inspection schedule.
5	Regulatory	40 CFR 60.693-2(a)(1)(ii)(B)	The total gap area between the secondary seal and the separator wall shall not exceed 6.7 cm ² /m (0.32 in. ² /ft) of separator wall perimeter.	The total gap area for the slop oil tanks 79 and 697 were not included in inspection reports.	Add the total gap area for the slop oil tanks to the inspection log sheets and inspection reports.
6	Regulatory	40 CFR 60.693-2(a)(2)	Each opening in the roof shall be equipped with a gasketed cover, seal, or lid, which shall be maintained in a closed position at all times, except during inspection and maintenance. Emergency roof drains for removal of storm water shall be fitted with a slotted membrane fabric cover that covers at least 90 percent of the drain opening area or a flexible fabric sleeve seal.	Approximately, one-third of the hatches on the 90-degree channel and oil-water separator were not fully latched. The facility may be able to demonstrate that the latching of at least the two latches opposite the hinge of the hatch provides a tight seal.	Step up the inspection schedule/emphasis and retraining on the hatches to reestablish that the only correct position for the hatches is completely closed and all latches tightened except when in active use.
7	Regulatory	40 CFR 60.692-3(e)	Slop oil from an oil-water separator tank and oily wastewater from slop oil handling equipment shall be collected, stored, transported, recycled, reused, or disposed of in an enclosed system. Equipment used in handling slop oil shall be equipped with a fixed roof with vent to a control or a floating cover.	The slop oil channel (formerly the skimmer on the three bays that are out of service) at the end of the secondary oil-water separator is not covered. The channel is used to move oil from the adjacent in-service oil skimmers to the underground conduit to the shop oil pumps. The uncovered portion is approximately 8 feet in length, 1 foot width.	The permanent cover was installed on January 20, 2020. This area will be included in the inspection log.

TABLE 4-1
QQQ Compliance Audit Findings
NSPS Subpart QQQ Review and Audit
BP Husky Toledo Refinery

Finding No.	Finding Type	Regulatory Citation	Basis	Finding	Recommended Corrective Action
8	Regulatory	40 CFR 60.698(a) and (b)(1), 60.7(a)(1) and (3).	<p>Submit a report within 60 days after initial startup a certification that the equipment necessary to comply with these standards has been installed and that the required initial inspections or tests of process drains, sewer lines, junction boxes, oil-water separators, and closed vent systems and control devices have been carried out.</p> <p>A notification of the date construction (or reconstruction as defined under §60.15) of an affected facility is commenced postmarked no later than 30 days after such date. This requirement shall not apply in the case of mass-produced facilities which are purchased in completed form.</p> <p>A notification of the actual date of initial startup of an affected facility postmarked within 15 days after such date.</p> <p>An owner or operator electing to comply with the provisions of §60.693 shall notify the Administrator of the alternative standard selected in the report required in §60.7.</p>	<p><u>New individual drain systems</u> were installed as part of the flare gas recovery, west flare knock-out and seal drain, and TFO projects. A certification of necessary equipment to meet the standard was supplied for the TFO project, but the submittal did not include the information regarding the initial inspection. No certification that the necessary equipment was installed or that the initial inspection had been carried out for the flare gas recovery and west flare knock-out could be located. The flare gas recovery and TFO projects were subject to PTI air permitting.</p> <p>Submittal of the notification of date of construction, and actual date of initial startup could not be verified for the above-mentioned projects. Reports to Air Services for the projects with air permitting PTI were not evident, but there may be a startup date inserted into the Profile in Air Services. Initial startup would be when the individual drain hub becomes an "Active drain", defined as receiving refinery wastewater from a process unit.</p> <p>The above-mentioned projects do not appear to require the notification that an alternate standard for an individual drain system or oil-water separator was necessary, but the notifications available do not indicate that this aspect of QQQ notifications has been considered.</p>	<p>Develop a system to document the certification that necessary equipment was installed and the initial inspection conducted, prior to 60 days after initial startup. The QQQ notifications may be able to be combined with other startup notifications (such as for a PTI), but the elements specifically required by QQQ must be included.</p> <p>Either continue with stand-alone notifications for all construction date and initial start date notifications or submit these notification on a timely basis within Air Services. Determine if an Air Services entry can be made for projects not requiring an air permitting PTI (such as an insignificant activity, or under a facility wide condition).</p> <p>Send EPA follow-up notifications covering projects that triggered NSPS QQQ for which notifications for the construction startup, initial inspection and/or installation of sufficient controls were missed.</p>
9	Regulatory	40 CFR 60.7(a)(4)	A notification of any physical or operational change to an existing facility which may increase the emission rate of any air pollutant to which a standard applies, unless that change is specifically exempted under an applicable subpart or in §60.14(e). This notice shall be postmarked 60 days or as soon as practicable before the change is commenced and shall include information describing the precise nature of the change, present and proposed emission control systems, productive capacity of the facility before and after the change, and the expected completion date of the change. The Administrator may request additional relevant information subsequent to this notice.	Modified QQQ subject equipment was installed as part of the BGOT recycle gas compressor, flare gas recovery, east flare KO drum pumps and WWTU 18" sewer reroute projects. The construction notification (at least 60 days prior) would have been submitted by way of the PTI application for the BGOT and flare gas recovery projects. An air permitting PTI was not required for the east flare KO drum and WWTU 18" sewer reroute projects. There was no documentation to show a construction notification was submitted regarding the QQQ modified equipment.	Develop a system to document the prior notification of existing equipment undergoing modification and subject to QQQ, when an air PTI application is not submitted. This may also be addressed through adding the tracking of these types of projects within the MOC program.
10	Regulatory	40 CFR 60.698(c)	A report that summarizes all inspections when a water seal was dry or otherwise breached, when a drain cap or plug was missing or improperly installed, or when cracks, gaps, or other problems were identified that could result in VOC emissions, including information about the repairs or corrective action taken, shall be submitted initially and semiannually thereafter to the Administrator.	Semiannual reports representing the June 27, 2015 and April 20, 2019 overflow events from the sewer collection system into the South Impoundment as "other problems identified that could result in VOC emissions" meeting the 40 CFR 60.51(c) definition of a drain system malfunction were not available.	Submit this audit report to EPA to serve as notification of these two malfunction events.

5. MANAGEMENT OF CHANGE PROGRAM

ERM evaluated the design and implementation of the refinery's MOC process against the following specific criteria identified in the Consent Decree:

1. Prior to commencing the project, will it identify any construction, modification, or reconstruction of any refinery facility that will trigger Subpart QQQ applicability and specify an appropriate control(s) for the affected facility?

Audit Response – BPH's Management of Change program requires the completion of the Environmental Checklist for all changes at the refinery. The environmental checklist includes questions for "Wastewater Issues". The first question in this section addresses whether or not the change will result in additional wastewater flow or a change in pollutant discharge. If so, a review of a NPDES permit change is triggered. BPH is required to submit application form EPA 4309 to the Ohio EPA, Department of Surface Water, for all sewer or wastewater construction activities at the refinery. Application form EPA 4309 (and supporting drawings and engineering documents) are required by the Ohio EPA to obtain a "Permit-to-Install" for any sewer changes (including drains, catch basins and manholes) or wastewater treatment unit changes prior to construction. The information submitted for this application identifies in detail the changes to be made and the regulatory control requirements, including NSPS QQQ.

The checklist covers the addition of a new sewer drain and/or tie-ins to an existing sewer which would lead to the air permitting/NSPS QQQ applicability and control requirement determination. The checklist also has questions for the addition of a new or replacement drain, junction box or catch basin, oil/water separator upstream of the DAF, and/or replacement of a section of oily sewer line. All these questions are geared towards NSPS QQQ and air permitting determinations.

A "Yes" answer to any of the "Wastewater Issues" questions on the Environmental Checklist automatically creates an action item for further environmental review. The action item will be directed to the Environmental Team Leader or their designee. The Environmental Checklist will be attached to the MOC once the environmental impacts have been assessed. The review action item will then be closed and any additional environmental action items identified in the review will be assigned to the responsible parties. All environmental action items must be addressed prior to MOC closure. In practical terms this means an environmental representative has to attend the MOC meeting and be involved in the process.

As a good management practice, one improvement to the Environmental Checklist would be that BPH include updating the sewer maps, QQQ Master Equipment List and QQQ Inspection Logs as a result of a "Yes" response in the QQQ related sections.

The MOC procedure (PSM-007) indicates that multi-phase or projects covering long durations can be broken down into several MOCs so that the different phases or time periods can be acted upon and closed out individually. In this manner, permit approvals that take some time to acquire may be initiated by one MOC and the details of construction design may be covered by another MOC. The overall project is covered, but this could lead to a gap in environmental awareness of the project implications if the project as outlined in the earliest MOC (which is the prompt for acquiring a NPDES or Air PTI) undergoes a scope change or engineering design change after the initial project development and perhaps under another MOC. This seems to have been the case in 2013 when, according to the Ohio EPA, Reformer 3 project changes triggered QQQ and was not realized by BPH for a few quarters. Consistent MOC naming to indicate connection to

the initial project for any subsequent phases of that particular project will aid the environmental team with tracking and participating in all MOCs for the overall project.

The MOC procedure also outlines what changes at the facility initiate a MOC and what exceptions there are to initiating a MOC. Details of specific changes are listed in PSM-007 - Appendix C – Type of Change Guidelines. Three types of changes are described:

1. Process Change – Covered by MOC, unless there is an exception
2. Replacement-in-Kind – Do not require a MOC
3. Non-Process Changes – Not covered by MOC, but may be covered by other procedures.

Each of these sections in Appendix C contains lists of the types of changes that fall into these categories and where an MOC is required. The Replacement-in-Kind section, for instance, specifically indicates that the extension of a hydrocarbon drain to another drain does require an MOC. This is important to maintaining the proper level of control for NSPS QQQ.

The Non-Process changes section indicates the types of areas within the facility that are considered non-process.

- A. For purposes of this procedure, non-process facilities include, but are not limited to: equipment in non-process areas, building utilities, structures such as bridges, foundations, fences, parking lots, outdoor lighting, power, communications, excavations and grading.

The process wastewater system is not listed as a type of change in the Process Change section of Appendix C. It would not appear that the process wastewater system should be considered a Process Change but since other non-operating unit areas of the facility are listed as an example of non-process facilities, there could be confusion on whether a remote sewer line is or is not a Non-Process Change. A clarifying statement in the Process Change, Non-Process Change and Replacement-in-Kind sections of Appendix C indicating that a MOC is required for process wastewater system changes, including changes to drains, manholes, lift stations, above ground sewer piping, slop oil and/or oil-water separators sewers should be added.

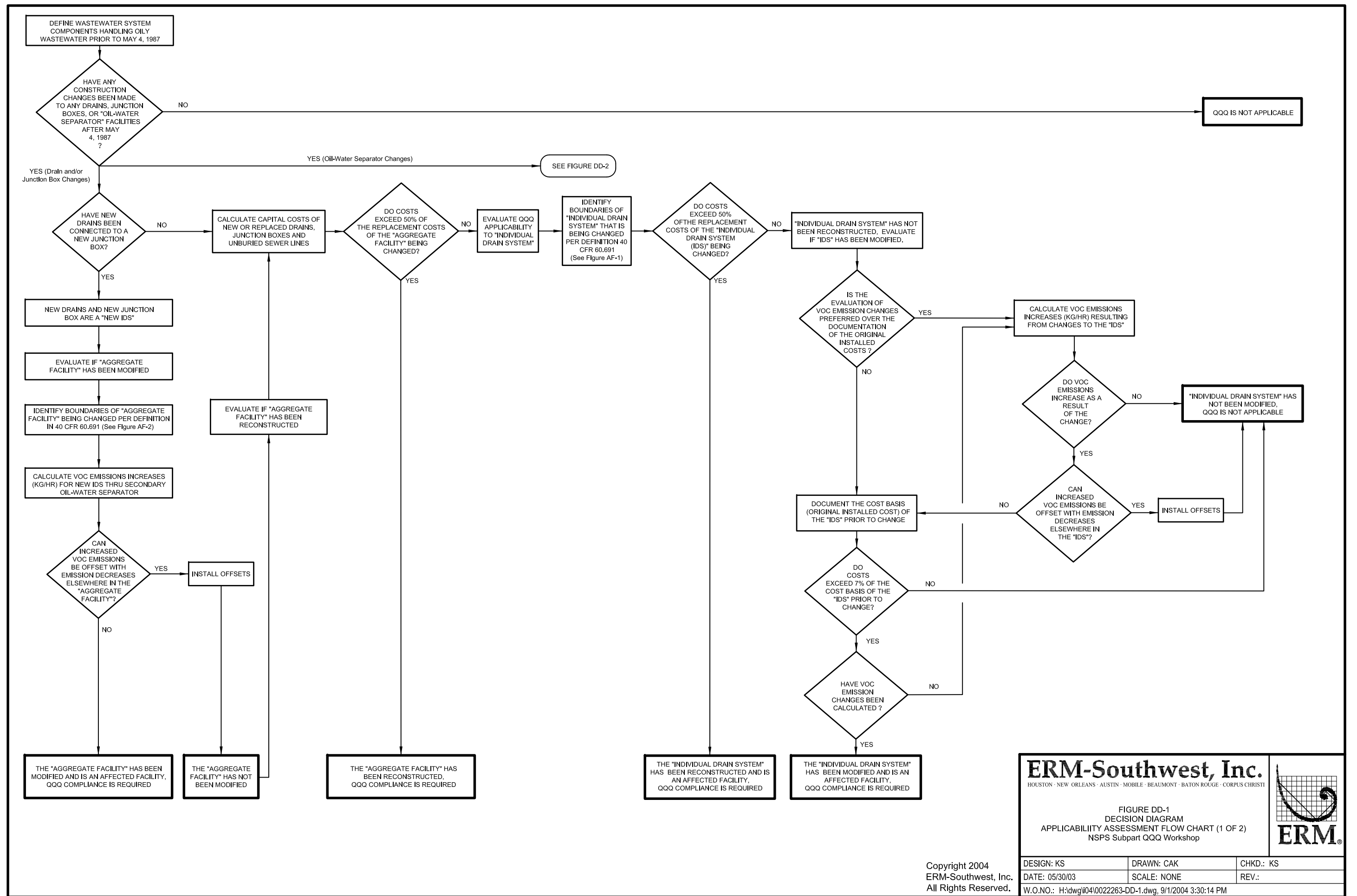
Appendix C of BPH's MOC Program needs to clarify that an MOC is required for any sewer, drain, lift station, manhole, slop oil, or oil-water separator changes regardless of location Process Area, Non-Process Area or Replacement in Kind.

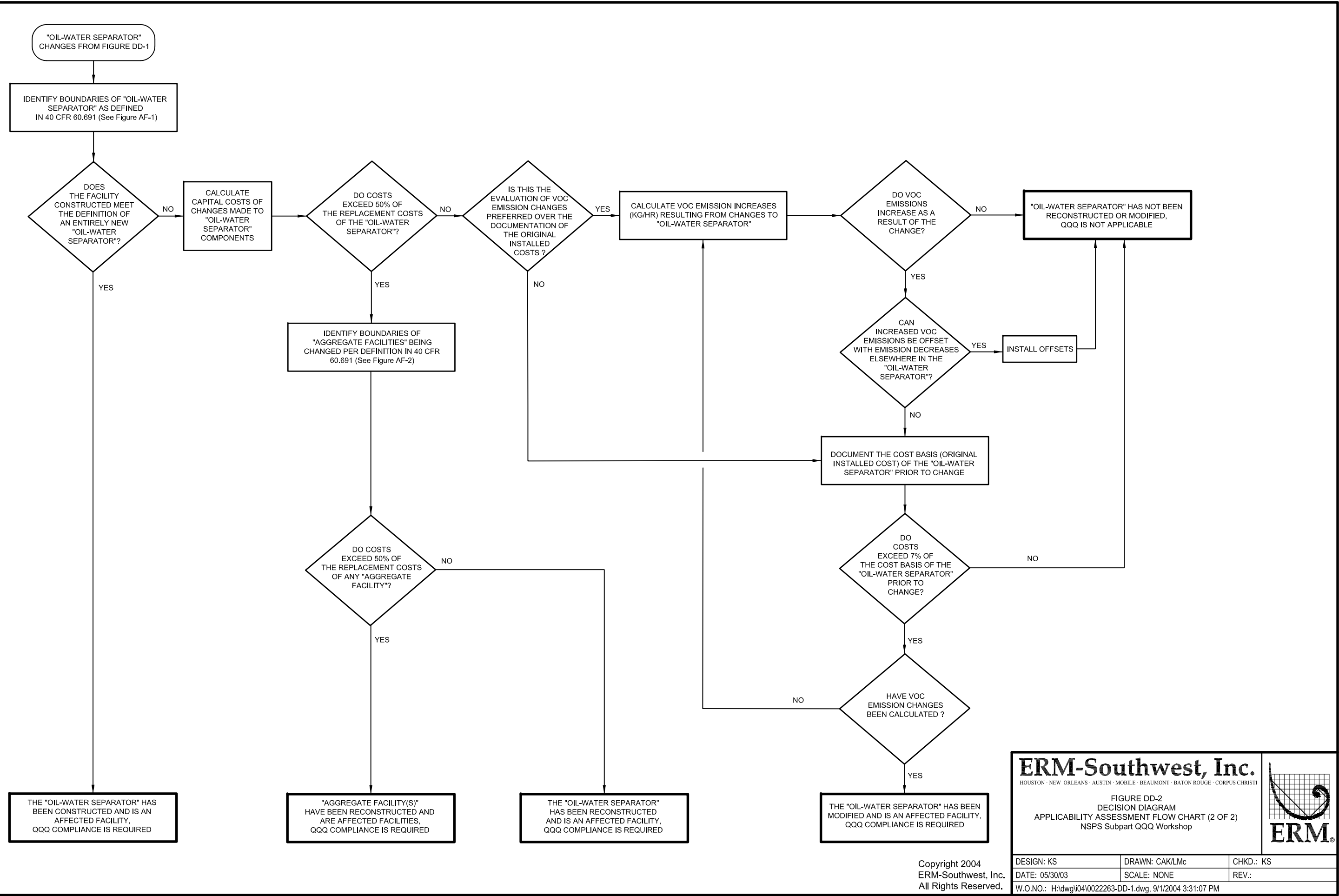
2. After the initial MOC review (even if it did not trigger Subpart QQQ), will it identify any construction, modification, or reconstruction of any refinery facility that will trigger or affect the applicability Subpart QQQ applicability and specify appropriate control(s) for the affected facility?

Audit Response – As described above, the MOC process requires the completion of the Environmental checklist to assess any and all environmental impacts. The MOC Procedure does not specifically address a change in project scope that occurs after the initial MOC is completed, but internal MOC discipline regarding any change should prompt another MOC if the project scope or engineering design is changed. Furthermore, the improvement to the Environmental Checklist, noted above, suggests that BPH include updating the sewer maps, QQQ Master Equipment List and QQQ Inspection Logs as a result of a “Yes” response in the QQQ related sections. One objective of updating the QQQ maps, lists and logs is to identify potential changes to the sewer drainage network after the project is implemented.

APPENDIX A APPLICABILITY DECISION DIAGRAMS

April 2020





APPENDIX B ERM APPLICABILITY ASSESSMENT ANALYSIS

April 2020

APPENDIX B
Table B-1 DRAFT
ERM NSPS Subpart QQQ Applicability Review of Post 2013 Projects Identified by BPH Toledo

BPH Toledo Refinery

ERM #	Auditor	Date	PTI Number	Unit/Project Area	Project Description	IDSs Changed	IDS #	IDS Description	Trigger QQQ?	QQQ Applicability Citation (see note (a) for full citation)	Comment	Recommended Corrective Action	Reference Drawings
II-1	W. Martin/K. Schroeder	23-Jan-13	918792	BGOT Recycle Gas Compressor	Increases design capacity of the BGOT unit to 51,000 BPD. Added new drain hubs, clean outs, catch basins and manhole.	Two	IDS 1-1	1 new drain hub and 1 new clean out and 1 new catch basin connected to a new manhole. Upgraded existing catch basin and downstream manhole.	Yes	40 CFR 60.690(b) modification of an aggregate facility.	In current QQQ management program along with adjacent sewer components that were not changed by this project but drain to the first downstream manhole.	None	Figure B-1
							IDS 1-2	2 new drain hubs, 4 new clean outs and 1 new catch basin connected to a new manhole. Upgraded 2 existing catch basins.	Yes	40 CFR 60.690(b) modification of an aggregate facility.	In current QQQ management program along with adjacent sewer components that were not changed by this project but drain to the first downstream manhole.	None	Figure B-1
II-2	K. Schroeder	16-Jul-14	985674	Flare Gas Recovery and Treating Project Process and Stormwater Sewers	Installed two new flare gas recovery compressors and associated equipment downstream of sewer changes described in Project II-1 (BGOT Recycle Gas Compressor)	Three	IDS 2-1	Relocated catch basin and added 1 new catch basin connected to and existing manhole.	No	40 CFR 60.692-1(d)(1) - Stormwater exemption	2 catch basins and an area drain are currently in QQQ management program, however, full boundaries of affected facility are not in QQQ management program.	Remove 2 stormwater catch basins and area drain from QQQ management program; OR If QQQ applicability is accepted, add 6 drain hubs, 2 area drains to the QQQ management program (see Figures B2A and B2B) and confirm added drains meet QQQ design standards for water p-trap. Provide EPA notifications, initial inspections and routine semi-annual reports for the added components.	Figure B-2A and B-2B
							IDS 2-2	Replaced a catch basin and added a manhole along a previously affected QQQ IDS	Yes	40 CFR 60.690(a)(4) replacement of components in a previously affected aggregate facility.	In current QQQ management program. Some drain hubs and clean outs downstream of replaced manhole were added to the QQQ management program but are not part of the IDS 2-2	Remove 4 drain hubs and 2 clean-outs from QQQ management program.	Figure B-2A and B-2B
							IDS 2-3	Added a new sewer branch consisting of 8 new drains and 5 new cleanouts to an existing manhole. The new sewer branch is downstream (although not part of) a previously affected QQQ IDS (IDS 2-2). New sewer branch connected to an existing manhole.	Yes (previously accepted in lieu of modification cost test). Possibly no if modification cost test is less than 7% of affected facility.	Possible exemption 40 CFR 60.14 (e)(2) - changes may be less than 7% of original capital cost of downstream and adjacent sewer components.	Only a portion of a QQQ affected facility is currently in the BPH QQQ monitoring program. If BPH continues to accept QQQ applicability for the portion of IDS 2-3, the full boundaries of the affected IDS need to be expanded.	Perform modification cost test or continue to accept QQQ applicability. If QQQ applicability is accepted, add approximately 16 drain hubs, 4 area drains, 3 catch basins and 9 clean outs to the QQQ management program (see Figures B2A and B2B) and confirm added drains meet QQQ design standards for water p-trap. Provide EPA notifications, initial inspections and routine semi-annual reports for the added components; OR Remove current IDS 2-3 components from QQQ management program if cost test is less than 7% of affected facility (including all downstream manholes).	Figure B-2A and B-2B
II-3	K. Schroeder	30-Oct-14	1003051	Subpart Ja West Flare Project - Drum Replacement and Sewer Installation.	Replaced existing West Flare Knockout and Seal drums south of the existing flare drum.	One	IDS 3-1	8 New Hub Drains, 2 clean outs, 1 new Catch Basin connected to 1 New Manhole; Six catch basins to east of new Manhole (downstream) were upgraded to meet QQQ Requirements	Yes	40 CFR 60.690(b) modification of an aggregate facility.	Components are in current QQQ management program.	None	Figure B-3A and B-3B.
II-4	K. Schroeder	22-Jan-15	1029739	Coker 2 South Charge Pump Sewers	Replaces the Coker2 charge pump with a new pump and associated drainage.	One	IDS 4-1	1 new area drain, 2 new clean outs and 1 new hub drain. Similar drains removed.	No	40 CFR 60.14 (a) - no VOC emission increase.	Components are NOT in current QQQ management program.	None	
II-5	K. Schroeder	22-Jul-15	1045305	Driftmeyer Ditch Stormwater Mitigation	Driftmeyer ditch had been a drainage way for off-site stormwater that crossed a portion of the refinery property. The inlet and outlet was cut off by City. This project provided drainage of the abandoned reach of the ditch within the refinery boundaries. The minor flow is sent to the refinery waste water treatment unit for processing.	None	NA	2 new catch basins constructed to drain standing water from Driftmeyer Ditch to two existing lift stations (DHT Lift Station and Lift Station 815). Both catch basins have turndowns and check valves in the discharge line to lift station.	No	40 CFR 60.692-1(d)(1) - Stormwater exemption	Components are NOT in current QQQ management program.	None	
II-6	K. Schroeder	10-Aug-15	1046480	Cooling Tower #1 Chemical Addition System	New chemical addition system building, drains to serve chemical make-up pumps at Cooling Tower #1.	None	NA	Eight floor drains, one sink drain tied into existing below grade sewer.	No	40 CFR 60.691 - Definitions - "Wastewater system"	Components are NOT in current QQQ management program. The cooling tower chemical addition system wastewaters are generated from ancillary activities and not from a "petroleum refinery process unit". Therefore, these drains are not covered by QQQ.	None	
II-7	K. Schroeder	11-Sep-15	1054419	Fresh Acid Tank Replacement	2 new sulfuric acid tanks, pumps, containment and drains for Alky Unit acid feed.	None	NA	3 new drain hubs and 3 new catch basins tied into existing catch basin.	No	40 CFR 60.14 (a) - no VOC emission increase and 40 CFR 60.692-1(d)(1) - Stormwater exemption	These drains are currently in the Refinery QQQ management program. VOC emissions not expected from fresh acid and stormwater drainage.	Remove 3 drains and 3 catch basins from QQQ management program.	Figure B-7A and B-7B

APPENDIX B
Table B-1 DRAFT
ERM NSPS Subpart QQQ Applicability Review of Post 2013 Projects Identified by BPH Toledo

BPH Toledo Refinery

ERM #	Auditor	Date	PTI Number	Unit/Project Area	Project Description	IDSs Changed	IDS #	IDS Description	Trigger QQQ?	QQQ Applicability Citation (see note (a) for full citation)	Comment	Recommended Corrective Action	Reference Drawings
II-8	K. Schroeder	8-Aug-16	1095223	Maintenance Shop Complex Sanitary Sewers	Sanitary sewers from the shop break room, restroom and shower facilities are collected and connected for discharge to a 66" trunk sewer leading to the City of Oregon wastewater treatment plant.	None	NA	various drains	No	40 CFR 60.691 - Definitions - "Wastewater system"	Components are NOT in current QQQ management program. The segregated sanitary wastewaters are not generated from a "petroleum refinery process unit". Therefore, these drains are not covered by QQQ.	None	
II-9	K. Schroeder	8-Aug-16	1095170	Maintenance Shop Complex	Construction of a new Maintenance Shop, including associated shop drains and stormwater sewers.	None	NA	Several drains, catch basins and manholes were installed to route shop wastewater and stormwater drainage to a new lift station where the water is pumped into the refinery sewer system.	No	40 CFR 60.691 - Definitions - "Wastewater system"	Components are NOT in current QQQ management program. The shop wastewaters and stormwaters are not generated from a "petroleum refinery process unit". Therefore, these drains, catch basins, manholes and the lift station are not covered by QQQ.	None	
II-10	W. Martin/K. Schroeder	15-Aug-16	1098127	Toledo Feedstock Optimization (TFO) Project	This project included new, replacement and refurbished sewerage system components in 10 different areas throughout the refinery for the Toledo Feedstock Optimization (TFO) project.	Several	NA	The TFO project was originally considered one project, however, there were 10 separate sewer changes at 10 different refinery process areas. Therefore, this audit separately reviewed the QQQ applicability for the 10 different changes included in the TFO project. These changes are detailed below (10.1 TO 10.10).					Figure B-10
II-10.1					Changes in the New Coker Gas Plant (CGP)	Several		Approximately 8 new manholes, 11 "dry boxes" (catch basins), 18 drains and 15 clean outs added.	Yes	40 CFR 60.690 (b) - New drains connected to a new junction box triggers the aggregate facility.	Coker Gas Plant drains, catch basins and manholes in QQQ program. Two existing downstream manholes need to be added to the boundaries of the affected facility. The 11 Dry Boxes and Safety Shower Drain do not appear to meet QQQ design standards for a water seal.	Add two manholes downstream of manhole M200B-01-MH-00210 to QQQ management program. Verify or upgrade the "Dry Boxes" and safety shower drain to provide water seal. Confirm downstream manholes meet QQQ design criteria (tight seal). Provide EPA notifications, initial inspections and routine semi-annual reports for the added components.	Figure B-10.1A and B-10.1B
II-10.2					Changes in the Coker 3 area to service area equipment.	One	IDS 10.2-1	11 new drain hubs, 6 clean outs and 1 new manhole. Sealed first existing upstream catch basin.	Yes	40 CFR 60.690 (b) - New drains connected to a new junction box triggers the aggregate facility.	In current QQQ management program. 3 drain hubs connected to existing catch basin are not in QQQ management program. Safety shower drain does not appear to have a water seal.	Add 3 drains entering CB371-1 to QQQ management program. Verify or upgrade safety shower drain to provide a water seal.	Figure B-10.2A and B-10.2B
II-10.3					Changes in the TRP Amine Unit to service new Rich Amine and Slop pumps.	One	IDS 10.3-1	6 new drain hubs, 3 clean outs and upgrades to 5 existing catch basins.	Yes	40 CFR 60.690 (a)(2) - modification of an individual drain system.	All drains in Amine System are In current QQQ management program.	None	Figure B-10.3
II-10.4					Sewer changes in the NHT Feed and Desalter area.	Several		Approximately 24 new drain hubs, 12 "Dry Boxes" (catch basins), 12 clean outs, and 8 manholes with inspection ports.	Yes	40 CFR 60.690 (b) - New drains connected to a new junction box triggers the aggregate facility.	In current QQQ management program. The Safety Shower Drain does not meet QQQ design standards for a water seal according to the design drawings. Dry Boxes need verification of water seal or other QQQ design standard. Boundaries of affected facilities need to be expanded.	Verify or upgrade the "Dry Boxes" and safety shower drain to provide water seal or other QQQ control. Add 1 area drain, 3 drain hubs and 1 downstream manhole (north of the desalter area, see Figure B-10.4B) to QQQ management program. Confirm added components meet QQQ design standards. Provide EPA notifications, initial inspections and routine semi-annual reports for the added components.	Figure B-10.4A and B-10.4B
II-10.5					Coker gas pipe rack changes included in project II-10.3								
II-10.6					New desalter sewer changes included in project II -10.4 and II-10.7								
II-10.7					Changes to crude 1 desalter make-up water pumps.	One	IDS 10.7-1	Relocated 1 drain hub, added 1 drain hub and one clean out.	No	highly likely exempt due to: 40 CFR 60.14 (e)(2) - less than 7% of the original cost basis. OR 40 CFR 60.692-2 (d) - new drains flow into an existing catch basin (constructed before May 4, 1987) are exempt from QQQ.	3 Drains and 3 clean outs are in existing QQQ management program. However, full boundaries of an affected facility are not in QQQ program if BPH continues to accept QQQ applicability.	Confirm catch basin was constructed prior to May 4, 1987 and, if so, remove 3 drains and 3clean out from QQQ management program. OR Perform 7% modification cost test for very large IDS. If costs are less than 7%, remove 3 drains and 3 clean outs from QQQ management program. If above exemptions can't be documented, expand boundaries of the QQQ affected facility in Crude 1 Unit and add approximately 17 more drains, 2 surface drains 2 catch basins and 1 manhole. Verify added components meet QQQ design standards for water seals and tight covers. Provide EPA notifications, initial inspections and routine semi-annual reports for the added components.	Figure B-10.7A and B-10.7B.
II-10.8					Sewer changes to provide drainage for two new pumps near foul condensate stripper.	One	IDS 10.8-1	Added 3 new area drains, 2 drain hubs and 1 clean out. Reduced emissions at by adding water seals at 11 existing drain hubs and 4 existing catch basins in same IDS.	No	40 CFR 60.14 (a) - no VOC emission increase.	Components are NOT in current QQQ management program.	None	
II-10.9					Desalter pipe rack changes included in project 10.4 and 10.6.								
II-10.10					OSBL sewer changes included in project 10.4 and 10.6.								

APPENDIX B
Table B-1 DRAFT
ERM NSPS Subpart QQQ Applicability Review of Post 2013 Projects Identified by BPH Toledo

BPH Toledo Refinery

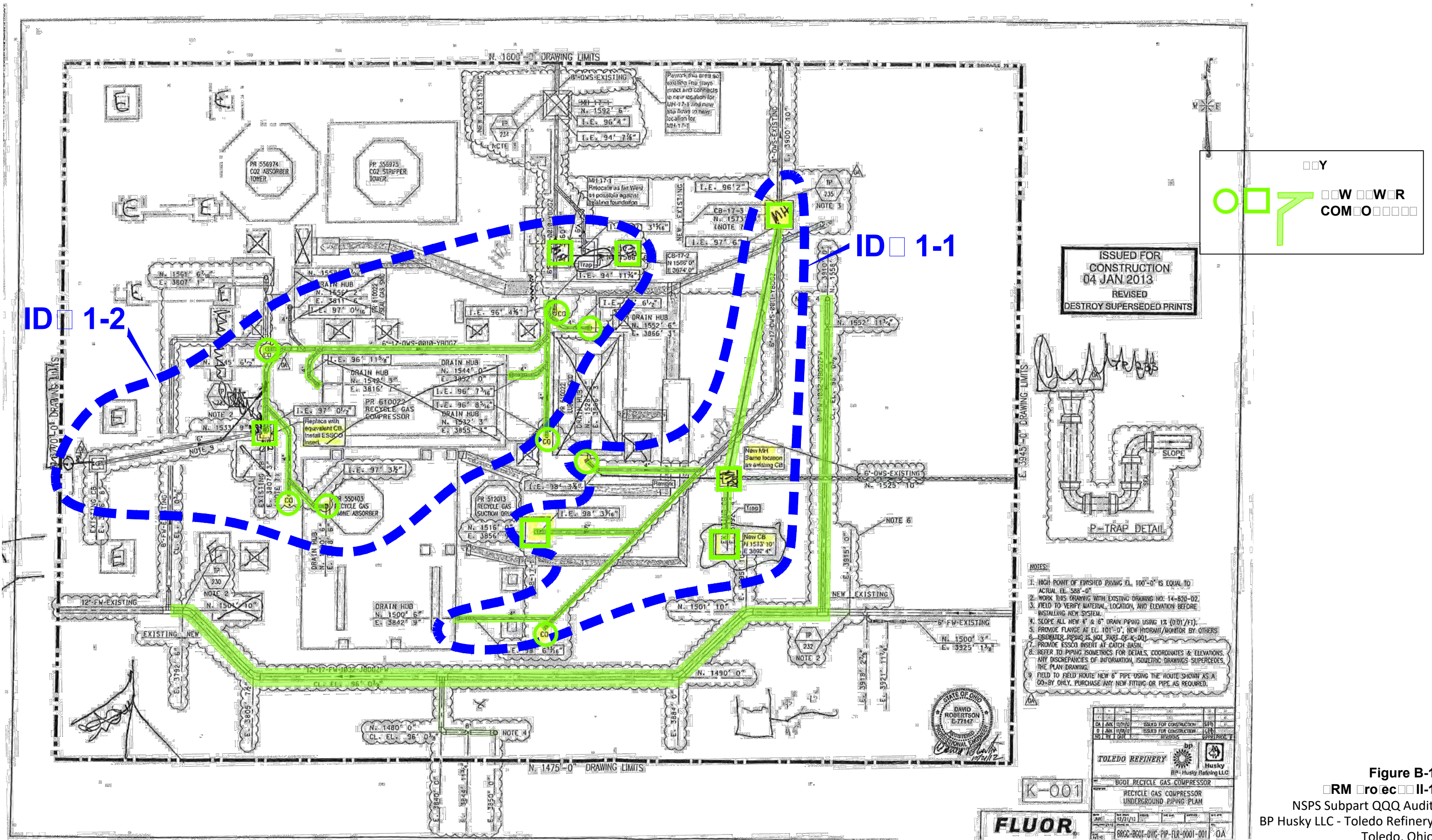
ERM #	Auditor	Date	PTI Number	Unit/Project Area	Project Description	IDSs Changed	IDS #	IDS Description	Trigger QQQ?	QQQ Applicability Citation (see note (a) for full citation)	Comment	Recommended Corrective Action	Reference Drawings
II-11	K. Schroeder	3-Jan-17	1128979	Maintenance Shop Complex	This project relocated the tie-in point for the force main from Project II-9.	None	NA	Industrial waste revision to change tie-in location to MH54-4	No	40 CFR 60.691 - Definitions - "Wastewater system"	These components are NOT in current QQQ management program. The shop wastewaters and stormwaters are not generated from a "petroleum refinery process unit". Therefore, these drains, catch basins, manholes and the lift station are not covered by QQQ.	None	
II-12	W. Martin	26-Jun-17	1155498	Catch Basin Installation for PSV 3025 Discharge.	This catch basin services boiler blowdown discharge and no refinery process wastewater.	One	IDS 12-1	New catch basin was installed to collect boiler blow down water. This catch basin was connected to the Oily Water Sewer.	No	40 CFR 60.691 - Definitions - "Wastewater system"	These components are NOT in current QQQ management program. The boiler blowdown is not generated from a "petroleum refinery process unit". Therefore, the catch basin is not covered by QQQ.	None	
II-13	W. Martin	18-Jul-17	1157122	TFO sewer revisions to two of the 11 sewer projects covered in project II-10.	Fowl Condensate Stripper Area Modification/ Coker Gas Plant Manhole Relocation	Two	IDS 13-1	Two drains at Pumps 600961 and 600962, 2 cleanouts, 1 catch basin ,CB 288-A, and 1 manhole, MH261-A.	Yes	40 CFR 60.690(b) modification of an aggregate facility.	These components are included in current QQQ management program.	None	Figure B-13
							IDS 13-2	This project is in the TFOSR Coker Gas Plant. A manhole relocation is near Hydrogenation Flash drum RS11113 (south side). Manhole MH 00209 is being relocated. 31" of 24" new ductile pipe sewer from a manhole will connect to it and from MH 00209 33' feet of 24" ductile pipe sewer will connect to MH 00210 WPM 110119	No	40 CFR 60.14(a) No emission increase		None	
II-14	W. Martin	11-Oct-17	1167454	Once Thru Water Tempering	This project to provide a new pump in the Coker 2 Unit to convey warmed once through cooling water to the refinery water treatment plant during the winter was never implemented.	None	NA	No changes	No	No changes made			
II-15	W. Martin	6-Dec-17	1200612	Sump 1 Offloading - Offloading Truck Connection and Containment Slab	This project modifies the existing containment vault (Sump #1) to include a vacuum truck offloading connections.	Two	IDS 15-1	1 drain and two connections were added to an existing manhole (manhole #6).	No		These components are in the BWON program.		
							IDS 15-2	1 drain was connected to an existing catch basin.	No		These components are in the BWON program.		
II-16	K. Schroeder	14-Dec-17	1200613	Alky1 Caustic Storage and Track 10 upgrades	A new caustic storage and pumping system for the Alky 1 area of the refinery.	One	IDS 16-1	4 drain hubs, 2 safety shower drains, 3 new catch basins and 1 new MH, converting 2 existing catch basins to manholes. Flow ties into an existing 18" oily water sewer line which drains to the wastewater treatment facility.	Yes	40 CFR 60.690(b) modification of an aggregate facility.	Components currently in the QQQ management program. The drainage from the caustic storage tank areas discharges to an existing portion of the QQQ sewer system. The safety shower drain does not appear to have a water seal.	Verify or provide water seal for safety shower drain.	Figure B-16
II-17	W. Martin	17-Jan-18	1209567	Sat 7 UPS Replacement Project Sewer Installation	4 new hub drains for roof stormwater collection, each with p-trap vapor seal and new 6" buried sewer to existing manhole connecting sewer to refinery Oily Water Sewer	One	IDS-17	A new sewer installed to convey stormwater from a bldg. roof via 4 drains to an existing MN	No	40 CFR 60.692-1(d)(1) - Stormwater exemption	Components not in QQQ management program. Roof drain water contains no VOC.	Confirm p-trap on roof drains	
II-18	K. Schroeder	22-May-18	1226379	East Flare KO Drum Pumps Sewer Installation	This project will replace existing pumps at the east flare knockout drum with two new pumps. Pump pad stormwater drainage and condensate will be collected and sent to the existing oily water sewer.	One	IDS 18-1	This project will add three new drain hubs and one pump pad area drain. These components will be connected to the existing oily water sewer.	Yes	40 CFR 60.690(a)(2) - new components added to an existing QQQ IDS.	This area was not in service as of July 16, 2019. The drainage from the east flare knockout areas discharges into an existing QQQ IDS which is currently being inspected according to the QQQ management program.	Add 3 pump drains and 1 area drain in the new East Flare KO Drum pump area to the QQQ management program when in service.	Figure B-18A and B-18B
II-19	W. Martin	10-Jul-18	1230234	H2 Plant Feed Gas Contactor Replacement	This project adds 2 oily water drain hubs connected to existing sewers through a buried y-connection. An existing area drain will be converted to a catch basin.	One	IDS 2-3	The new components drain southward to the existing W. E trunk sewer to the south that ERM project II-2 drains into (as well as ERM II-1 (BGOT) that ties into II-2).	No	See IDS 2-3, Project II-2.	Components are in the current QQQ management program.	See IDS 2-3 of Project II-2.	Figure B-19
II-20	K. Schroeder	8-Jun-18	1231567	New Praxair Nitrogen Plant	This is an OSBL project for the new Praxair Nitrogen Plant.	One	IDS 20-1	The project will install three drain hubs (with p-trap water seals) in the Praxair operations to collect condensed water vapor. The drainage from these drain hubs will be connected to an existing buried 4-inch sewer line via a Y-connection which drains to the refinery wastewater treatment plant.	No	40 CFR 60.14 (a) - no VOC emission increase.	Components not in QQQ management program.	none	
II-21	W. Martin/K. Schroeder	5/24/2018	1226385	WWTU Flocculators	This project is in design to install variable speed flocculators ahead of the dissolved air flotation basins to provide low energy mixing.	None	NA	This project is downstream of the oil-water separator.	No	NSPS Subpart QQQ is not applicable downstream of the oil-water separator.	Components not in QQQ management program.	none	
II-22	W. Martin/K. Schroeder	5/9/2018	1224813	WWTU 18" Sewer Reroute	This project involves rerouting an existing 18-inch sewer line immediately prior to the Wastewater Inlet Channel. This is an enclosed concrete sewer pipe.	One	IDS 22-1	This is an end-of-line projects prior to the wastewater inlet channel.	Yes	40 CFR 60.690(a)(2) - changes made to an existing QQQ IDS.	This project changes equipment already included in the refinery's QQQ management program.	Include semi-annual inspection of unburied portion of the 18-inch sewer line.	

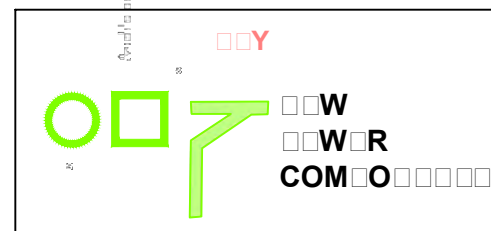
APPENDIX B
Table B-1 DRAFT
ERM NSPS Subpart QQQ Applicability Review of Post 2013 Projects Identified by BPH Toledo

BPH Toledo Refinery

ERM #	Auditor	Date	PTI Number	Unit/Project Area	Project Description	IDSs Changed	IDS #	IDS Description	Trigger QQQ?	QQQ Applicability Citation (see note (a) for full citation)	Comment	Recommended Corrective Action	Reference Drawings
II-23	W. Martin/K. Schroeder	Future	Future	WWTU RAS/WAS/Mud Well Chemical Injection Upgrades	this project is in design to upgrade various components of the wastewater treatment unit downstream of the oil water separator. Including the Recycled Activated sludge (RAS)	None	NA	All of these projects are downstream of the oil-water separator.	No	NSPS Subpart QQQ is not applicable downstream of the oil-water separator.	Components not in QQQ management program.	none	

(a) Regulatory Citations:
40 CFR 60.14 (a) Except as provided under paragraphs (e) and (f) of this section, any physical or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies shall be considered a modification within the meaning of section 111 of the Act
40 CFR 60.14 (e) Upon modification, an existing facility shall become an affected facility for each pollutant to which a standard applies and for which there is an increase in the emission rate to the atmosphere
40 CFR 60.14 (e)(2) The following shall not, by themselves, be considered modifications under this part
40 CFR 60.690 (a)(2) An increase in production rate of an existing facility, if that increase can be accomplished without a capital expenditure on that facility
40 CFR 60.690(a)(4) An individual drain system is a separate affected facility.
40 CFR 60.690(a)(4) An aggregate facility is a separate affected facility.
40 CFR 60.690(b) Notwithstanding the provisions of 40 CFR 60.14(e)(2), the construction or installation of a new individual drain system shall constitute a modification to an affected facility described in §60.690(a)(4). For purposes of this paragraph, a new individual drain system shall be limited to all process drains and the first common junction bo
40 CFR 60.691 *Wastewater system* means any component, piece of equipment, or installation that receives, treats, or processes oily wastewater from petroleum refinery process units
40 CFR 60.692-1(d)(1) Stormwater sewer systems are not subject to the requirements of this subpart.
40 CFR 60.692-2 (d) Except as provided in paragraph (e) of this section, each modified or reconstructed individual drain system that has a catch basin in the existing configuration prior to May 4, 1987 shall be exempt from the provisions of this section
40 CFR 60.692-2 (e) Refinery wastewater routed through new process drains and a new first common downstream junction box, either as part of a new individual drain system or an existing individual drain system, shall not be routed through a downstream catch basir





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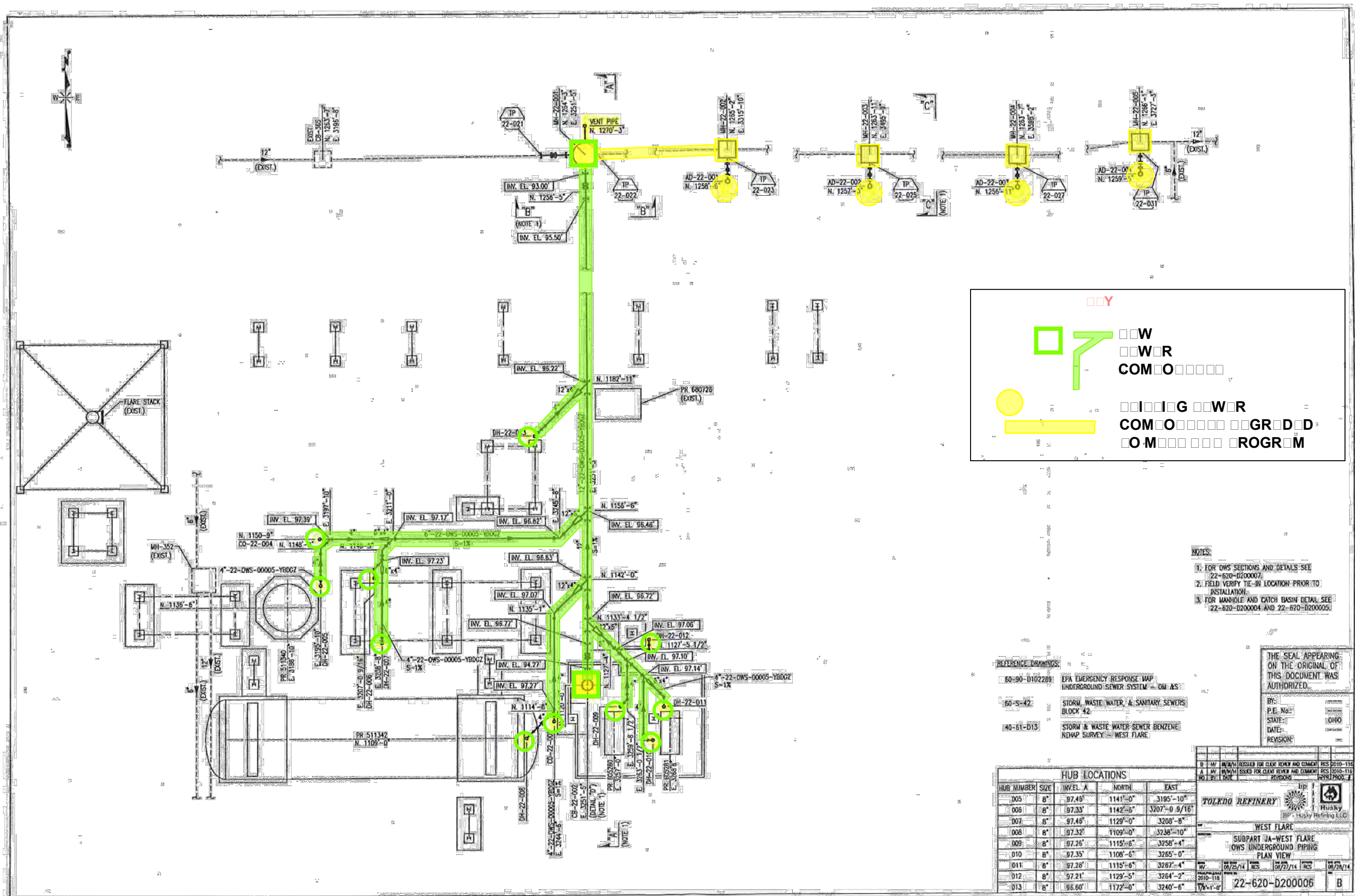
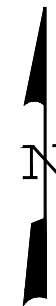


Figure B-
RM ro ec II-
NSPS Subpart QQ Audit
BP Husky LLC - Toledo Refinery
Toledo, Ohio



BP Husky LLC - Toledo Refinery
Toledo, Ohio

SOURCE: PH Drawing 6000D022
rev 2020

Austin\Projects\0507641\DM\28182H(AppB_figs).pdf





1. THE LOCATION, SIZE AND CONDITION OF EXISTING STRUCTURES, EQUIPMENT, UTILITIES, SERVICES AND OTHER RELEVANT ENGINEERING FEATURES SHALL BE VERIFIED PRIOR TO FABRICATION OR ERECTION TO DETERMINE CLEARANCES, DIMENSIONS AND FABRICATION OR ERECTION PROCEDURES. ADEQUATE BRACING AND TEMPORARY SUPPORTS FOR THE STABILITY OF ALL EXISTING RELEVANT FEATURES SHALL BE PROVIDED BY THE CONTRACTOR.

CAST-IN-PLACE CONCRETE:

1. CAST-IN-PLACE CONCRETE CONSTRUCTION SHALL CONFORM TO THE LATEST ACI 350 CODE, ACI STANDARDS, ACI 305 DETAILING MANUAL, AND ACI 301 "STANDARD" SPECIFICATION FOR STRUCTURAL CONCRETE, EXCEPT AS MODIFIED HEREIN. SUBMIT SHOP FABRICATION DRAWINGS AND RECEIVE APPROVAL PRIOR TO FABRICATION.
 2. ULTIMATE COMPRESSIVE STRENGTH OF CONCRETE IN 28 DAYS SHALL BE 4000 PSI.
 3. REINFORCING BARS: ASTM A615 GRADE 60, WELDING OR TACK WELDING OF REINFORCING BARS SHALL NOT BE PERMITTED.
 4. ALL CONCRETE SHALL CONTAIN A WATER REDUCING ADMIXTURE CONFORMING TO ASTM C494 TYPE A,D,E,F, OR G.
 5. USE AN AIR-ENTRAPPING ADMIXTURE CONFORMING TO ASTM C260, IN ALL CONCRETE. THE AMOUNT OF ENTRAINED AIR SHALL BE 6% \pm 1%.
 6. ALL EXPOSED CONCRETE SHALL BE CURED USING A LIQUID MEMBRANE CURING COMPOUND WITH A MAXIMUM UNIT MOISTURE LOSS OF 0.039 GR./SQ. CM @ 72 HOURS AND APPLIED AT A MAXIMUM COVERAGE RATE OF 200 SQ. FT./GAL (i.e. "MASTERSURE N-SEAL-HS" BY CHEMREX INC. (800) 433-9517). CURING COMPOUND SHALL BE APPLIED WITHIN 1 HOUR AFTER FINAL TROWELING OR FORM REMOVAL. ALL CONCRETE SHALL BE CURED FOR NOT LESS THAN 7 DAYS.
 7. CHAMFER EXPOSED EDGES OF CONCRETE 3/4", UNLESS NOTED OTHERWISE
- B. CONCRETE MIX DESIGN:

A. WA

- CONCRETE MIX SHALL ONLY HAVE ENOUGH CEMENT TO DEVELOP THE REQUIRED STRENGTH. CEMENT SHALL NOT BE ADDED TO THE MIX TO ACHIEVE THE WATER/CEMENT RATIO. THE WATER SHALL BE THE VARIABLE, NOT THE CEMENT. WATER REDUCERS AND HIGH RANGE REDUCERS SHALL BE ADDED TO OBTAIN THE DESIRED WORKABILITY.
- D. ALL CEMENT SHALL BE ASTM C150 TYPE I OR TYPE II.
- C. THE MAXIMUM SIZE AGGREGATE SHALL BE 1" ASTM C33 (#57).
- D. CONCRETE WITH ENTRAINED AIR SHALL HAVE A WATER/CEMENT RATIO NOT EXCEEDING 0.40 ABSOLUTE RATIO BY WEIGHT.
9. CONCRETE CONSTRUCTION AND TESTING SHALL BE PERFORMED BY THE CONTRACTOR PER EP 4-3-2.

FOUNDATION:

1. DESIGN SOIL BEARING PRESSURE = 2500 PSF
2. NOTIFY THE RESIDENT ENGINEER AS SOON AS POSSIBLE OF ANY UNUSUAL SOIL CONDITIONS.
3. SET FOUNDATIONS AT ELEVATIONS SHOWN, OR ON FIRM UNDISTURBED MATERIAL OF DESIGN BEARING CAPACITY BELOW FROST DEPTH.
3. 4. EXCAVATION AND COMPACTION:
 - A. CARE SHALL BE TAKEN TO NOT DISTURB THE BOTTOM OF THE EXCAVATION. EXCAVATION TO FINAL GRADE SHALL NOT BE MADE UNTIL JUST PRIOR TO PLACING CONCRETE.
 - B. FILL SHALL BE PLACED IN LIFTS OF 6" MAXIMUM LOOSE DEPTH. EACH LIFT SHALL BE COMPACTED WITH A POWER VIBRATING COMPACTOR OR SIMILAR EQUIPMENT TO ASSURE MAXIMUM COMPACTION OF THE MATERIAL.
 - C. FILL SHALL BE BROUGHT TO UNDERSIDE OF SLAB OR INDICATED FINISHED GRADE.
 - D. THE FILL MATERIAL SHALL HAVE AN OPTIMUM MOISTURE CONTENT (+/- 2 PERCENT) ACCORDING TO MODIFIED PROCTOR ASTM D1557 DRY DENSITY, TO ACHIEVE THE REQUIRED COMPACTION PERCENTAGE. COMPACTION SHALL BE NOT LESS THAN 95 MAXIMUM DENSITY FOR COHESIONLESS MATERIAL.
 - E. PRIOR TO EXCAVATION AND DEMOLITION, CONTACT BP WASTE SPECIALIST FOR HANDLING AND DISPOSAL GUIDANCE AND SUBMIT WASTE HANDLING AND DISPOSAL NOTIFICATION FORM AS DIRECTED BY BP WASTE SPECIALIST.

STRUCTURAL STEEL:

1. ALL STRUCTURAL STEEL SHALL BE DESIGNED, DETAILED, FABRICATED, ERECTED AND WELDED IN ACCORDANCE WITH THE REQUIREMENTS OF AISC SPECIFICATIONS AND CODES OF STANDARD PRACTICE, AWS D1.1 (STRUCTURAL WELDING CODE - STEEL), AND THE CONTRACT DOCUMENTS, EXCEPT AS NOTED HEREIN.
2. STRUCTURAL STEEL: (W) SHAPES ASTM A992 & ALL OTHERS ASTM A36.
3. PRIOR TO EXCAVATION AND DEMOLITION, CONTACT BP WASTE SPECIALIST FOR HANDLING AND DISPOSAL GUIDANCE AND SUBMIT WASTE HANDLING AND DISPOSAL NOTIFICATION FORM AS DIRECTED BY BP WASTE SPECIALIST.
4. CONNECTIONS: WELD OR BOLT CONNECTIONS, AS INDICATED.
 - A. WHERE THE REACTION VALUES OF BEAMS, BRACING, STRUTS, ETC., ARE NOT SHOWN ON THE DRAWINGS, THE CONNECTIONS SHALL BE DESIGNED TO SUPPORT THE END REACTION DERIVED FROM THE ALLOWABLE UNIFORM LOAD TABLES IN PART 3, 13th EDITION OF THE AISC MANUAL OF STEEL CONSTRUCTION FOR THE GIVEN MEMBER SIZE, SPAN, AND YIELD STRENGTH.
 - B. THE MINIMUM NUMBER OF BOLTS IN BOLTED CONNECTIONS SHALL BE 2.
5. ALL STRUCTURAL STEEL SHALL BE GALVANIZED PER EP 10-3-B

WELDING:

1. ALL WELDING SHALL BE PERFORMED BY QUALIFIED WELDERS AND ALL WELDING DOCUMENTATION (WPS, PQR, WPO) SHALL BE PROVIDED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 5 OF AWS D1.1 FOR CARBON STEEL.
2. ALL FILLER METALS SHALL HAVE A MINIMUM SPECIFIED TENSILE STRENGTH OF NOT LESS THAN 70000 PSI.

GROUT:

1. GROUT FOR BASEPLATE SETTING SHALL BE 5-STAR GROUT INSTALLED AS A DRY PACK OR APPROVED EQUAL.

SEWER

1. CPVC PIPE, FITTINGS SHALL BE SCHEDULE 80 & MANUFACTURED FROM A TYPE IV, GRADE 1 RIGID CHLORINATED POLYVINYL CHLORIDE (CPVC) COMPOUND WITH A MIN. CELL CLASSIFICATION OF 23447 PER ASTM D1784.
2. ALL CPVC PIPE & FITTINGS SHALL BE MANUFACTURED IN STRICT COMPLIANCE TO ASTM F441.
3. ALL CPVC CONNECTIONS SHALL BE SOLVENT CEMENTED UNLESS NOTED OTHERWISE. PRIMER SHALL CONFORM TO ASTM F856. CEMENT SHALL CONFORM TO ASTM F493.

PRIMER: WELD-ON P70 PRIMER PER IPS OR EQUAL
CEMENT: WELD-ON 724 CPVC CEMENT PER IPS OR EQUAL
4. CPVC INSTALLATION TO ADHERE TO ASTM D2321 & EP 5-9-1.
5. ISOLATION VALVE TO BE 8" GATE VALVE WITH TRENCH ADAPTOR CS VALVE SHALL BE 150# RATED CLASS AAA2 ASTM A216 GR WCB, ASME B16.5 FLANGED (RAISED FACE)

BP OIL SITE TECHNICAL PRACTICES

- EP 1-0-1 - INDEX
- EP 1-1-1 - EXPLANATION AND USE OF TOLEDO SITE TECHNICAL PRACTICES (STP) CONTROL PROCEDURE
- EP 4-2-2 - EARTHWORK
- EP 4-2-3 - REINFORCED CONCRETE FOUNDATIONS
- EP 4-2-6 - GROUTING AND BASEPLATES FOR STRUCTURAL STEEL AND EQUIPMENT
- EP 4-3-2 - CONCRETE CONSTRUCTION REQUIREMENTS
- EP 4-3-3 - CONCRETE REINFORCEMENT FABRICATION
- EP 4-5-1 - STRUCTURAL STEEL
- EP 4-5-2 - STRUCTURAL STEEL CONSTRUCTION
- EP 4-5-3 - AUXILIARY STRUCTURES FOR OPERATION AND MAINTENANCE
- EP 10-3-1 - PAINTING
- EP 10-3-6 - GALVANIZED COATINGS

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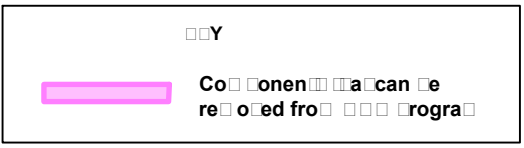
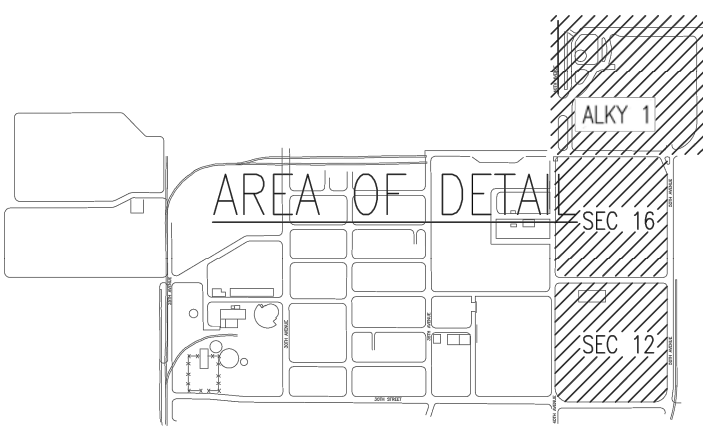
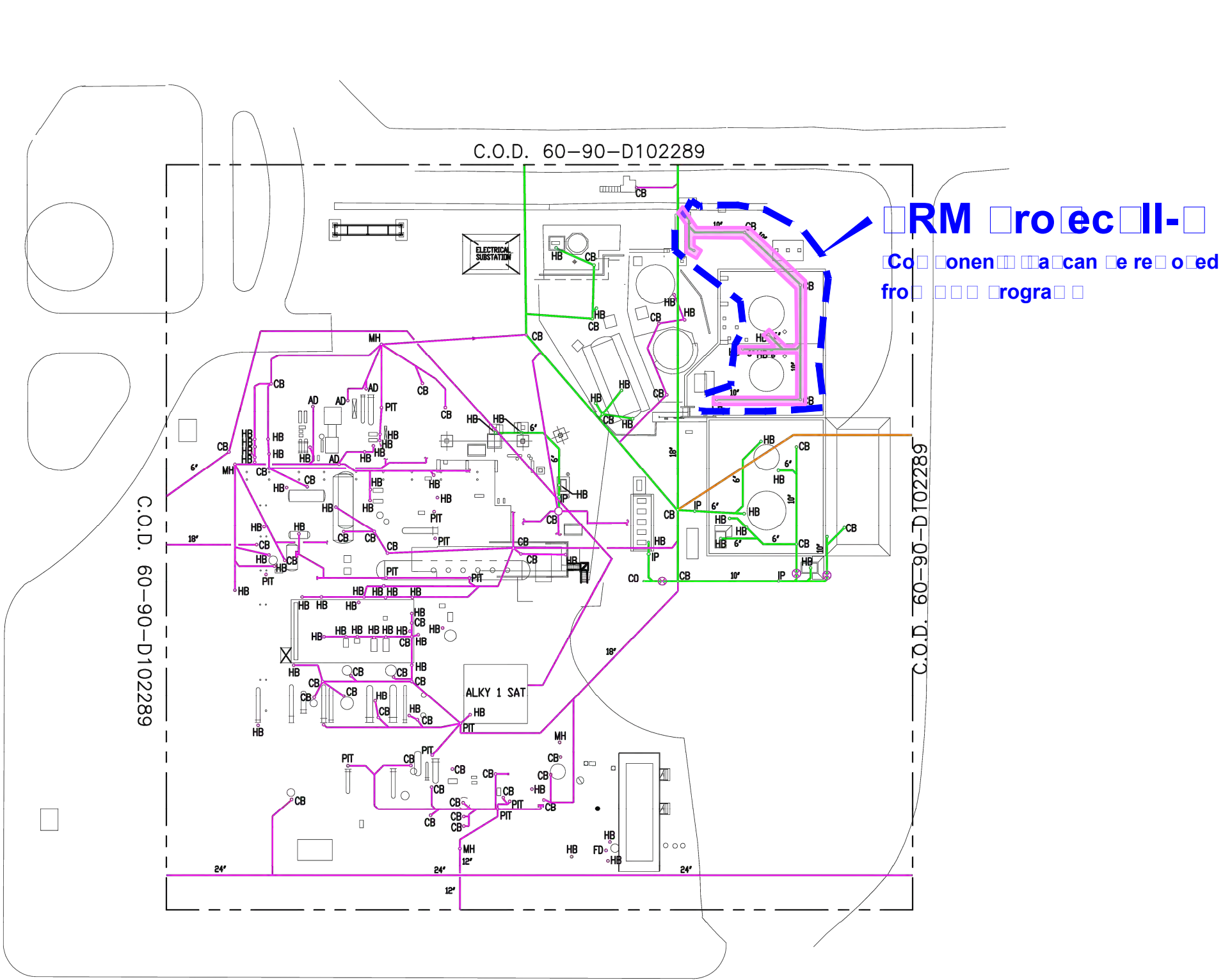
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NO	RF	1215	REUSONS						APPROVED		
			bp						 Husky BP - Husky Refining Co.		
			 TOLEDO REFINERY								
ALKY - 1											
FRESH AIR TANKS 653 & 654 REPLACEMENT FOUNDATION SLAB PLAN											
NOV	DATE PLOD		06/10/13		SHEET		1		TOTAL SHEET		1
2012-2013											
YES & NO		26-107-D SK-2									

Figure B-11

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BP Husky LLC - Toledo Refinery
Toledo, Ohio



LEGEND

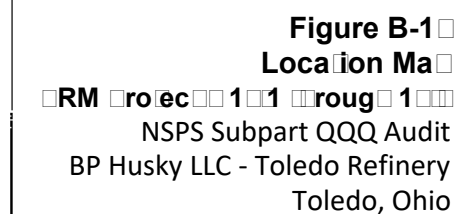
- ● ● CATCH BASIN/HUB BASIN/AREA DRAIN/YARD DRAIN
- □ □ MANHOLE/SUMP/PIT/JUNCTION BOX/LIFT STATION
- ▲ PLUG
- ▼ REDUCER
- VALVE
- DT DRAIN TILE
- IPV INDICATING POST VALVE
- WS WATER STRAINER
- AD AREA DRAIN
- CB CATCH BASIN
- DR DRAIN
- EMH ELECTRICAL MANHOLE
- HB HUB BASIN
- JB JUNCTION BOX
- LS LIFT STATION
- MH MANHOLE
- YD YARD DRAIN
- DH DRAIN HUB
- CO CLEAN OUT
- FD FLOOR DRAIN
- IP INSPECTION PORT
- QQQ SEWER
- NON-QQQ SEWER
- ABANDONED SEWER

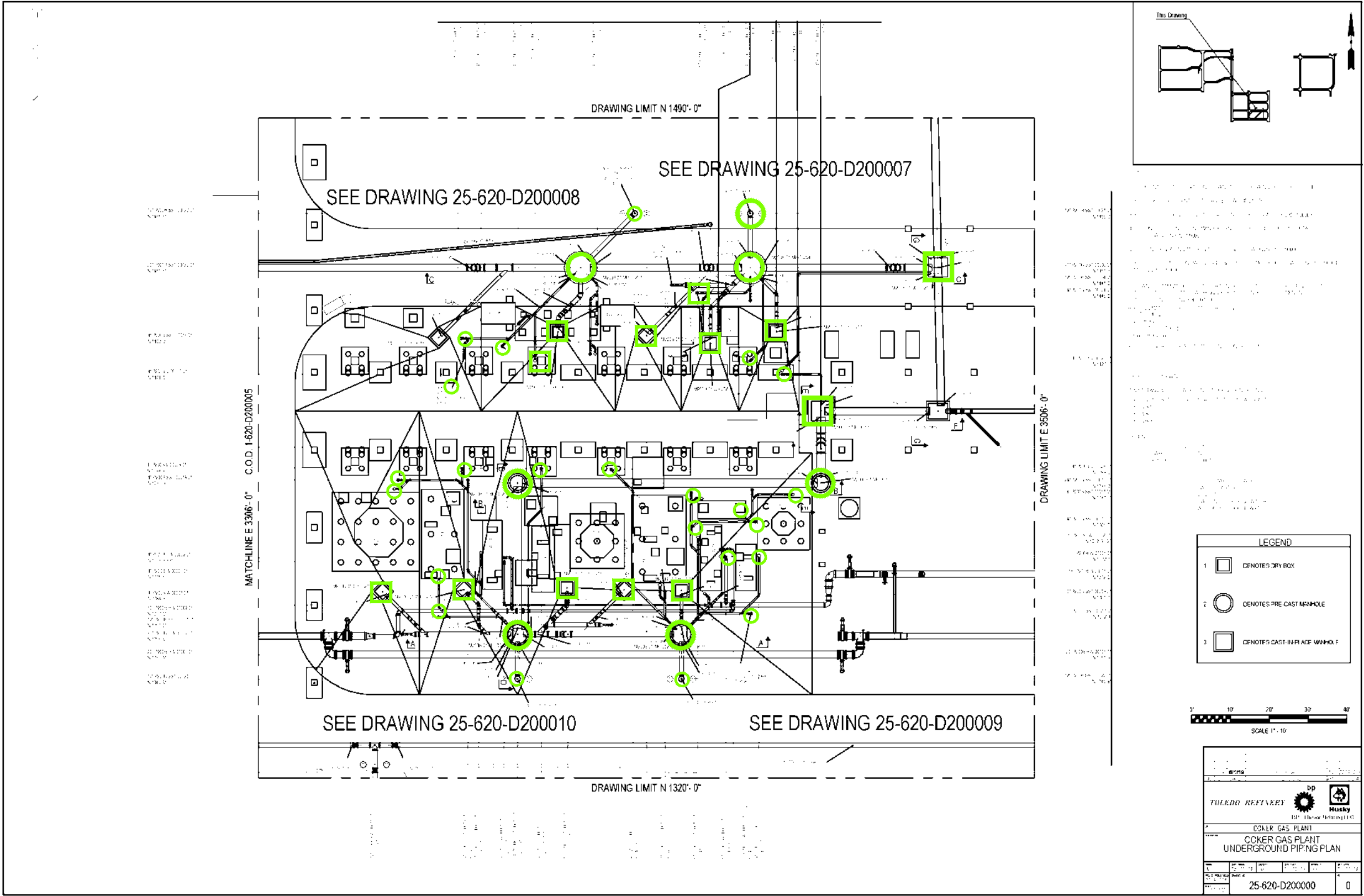


ENLARGED PLAN ALKY 1 AREA

Figure B-B
RM Project II-
Sewer Sulfuric Acid and
BP Husky LLC - Toledo Refinery
Toledo, Ohio

SOURCE: PH Drawing 6000D2000 rev
2000" Series Underground Sewer
System East Area
Austin\Projects\0507641\DM\28182H(AppB_figs).pdf

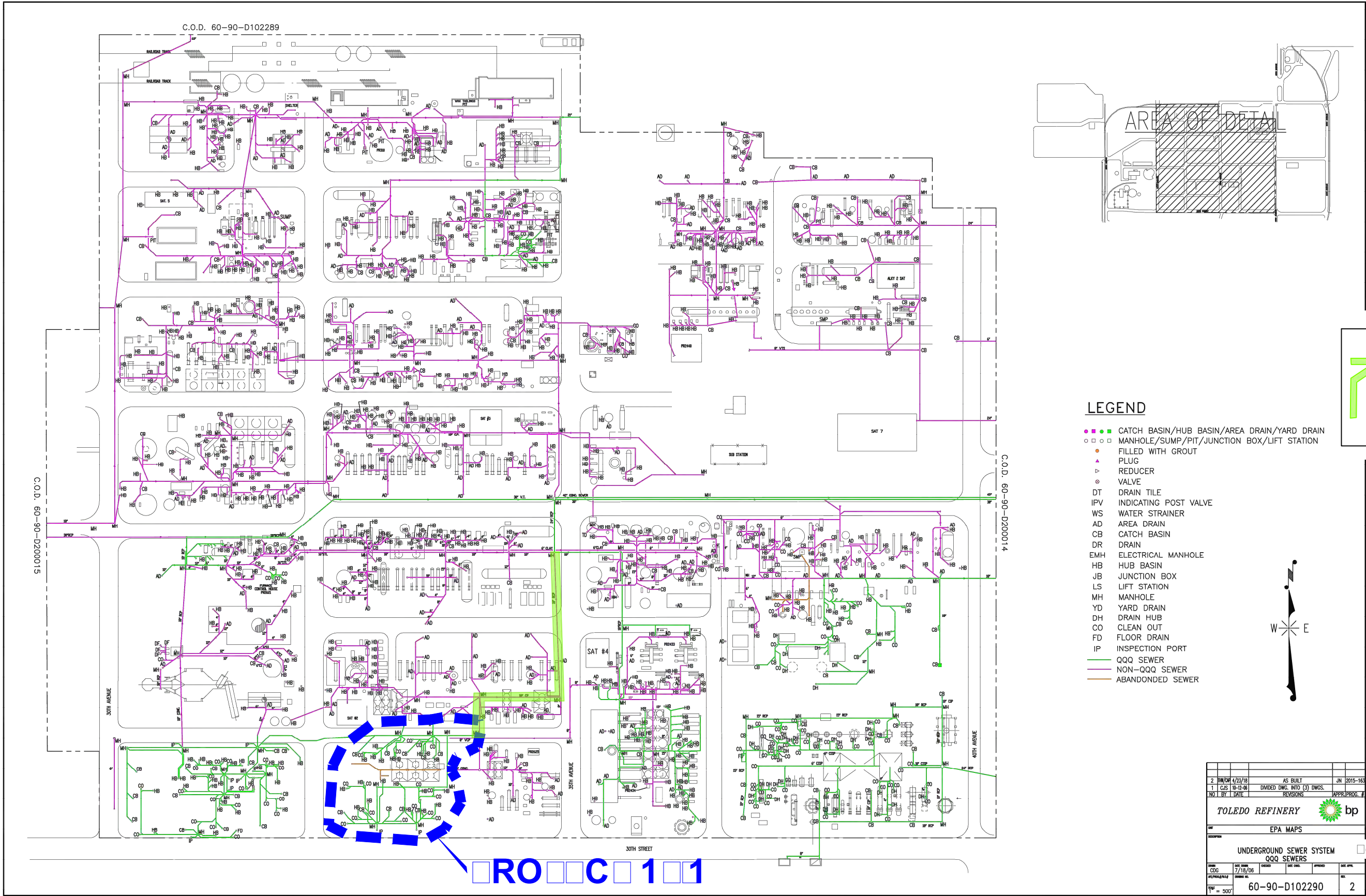




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Figure B-1
RM ro ec II-1
ew Co er Ga lan
NSPS Subpart QQQ Audit
BP Husky LLC - Toledo Refinery
Toledo, Ohio



2	10/18/18	AS BUILT	UN	2015-183
1	C/S 10-12-18	DIVIDED DWG. INTO (3) DWGS.		
NO	BY	DATE	REVISIONS	APPROVED
TOLEDO REFINERY				
EPA MAPS				
UNDERGROUND SEWER SYSTEM				
QQQ SEWERS				
DATE	DATE	DATE	DATE	DATE
7/18/06	7/18/06	7/18/06	7/18/06	7/18/06
60-90-D102290				2
BQ1791				

Figure B-11B
RM roec II-111
ew Co er Ga lan sewer Diagram
NSPS Subpart QQQ Audit
BP Husky LLC - Toledo Refinery
Toledo, Ohio

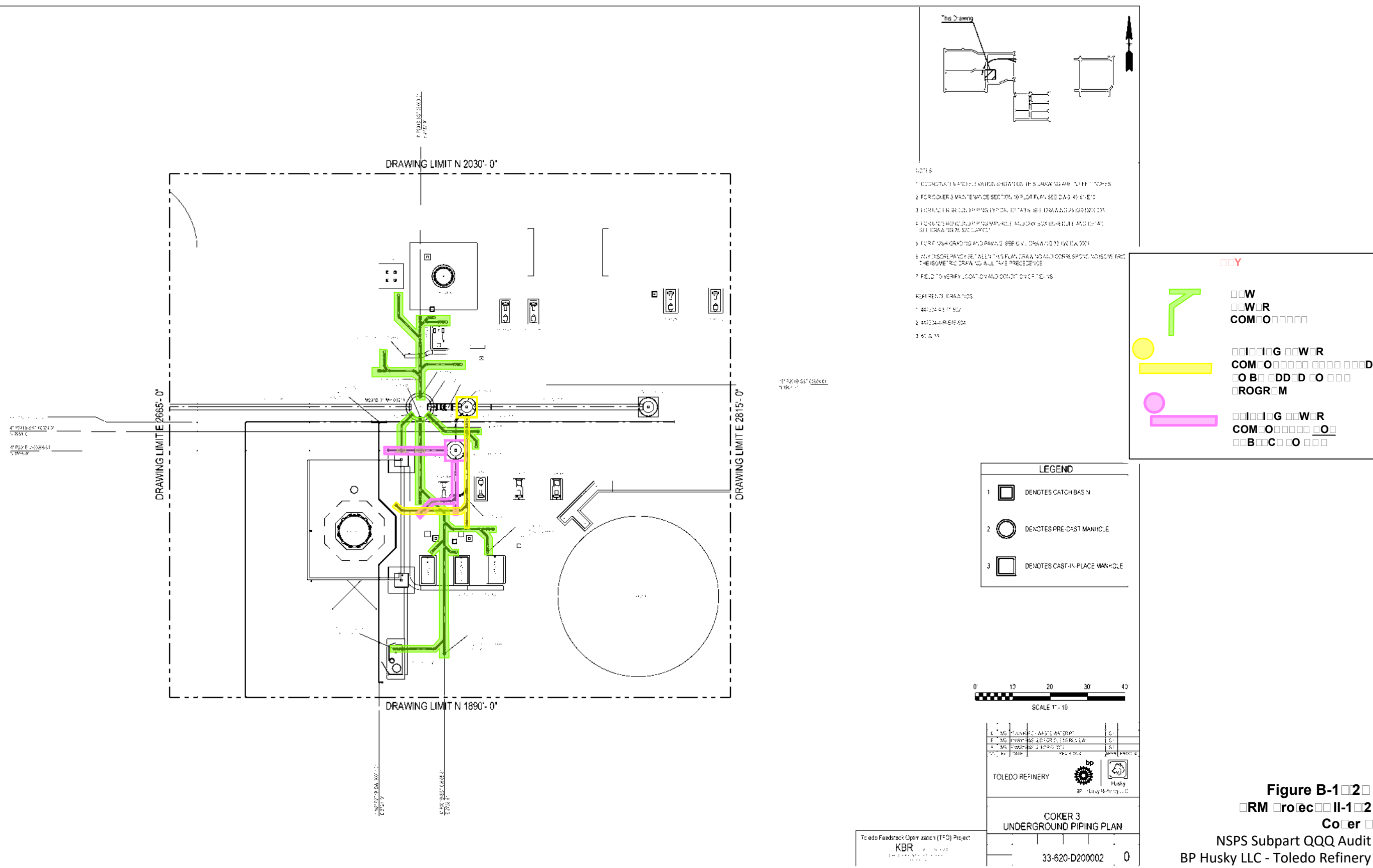
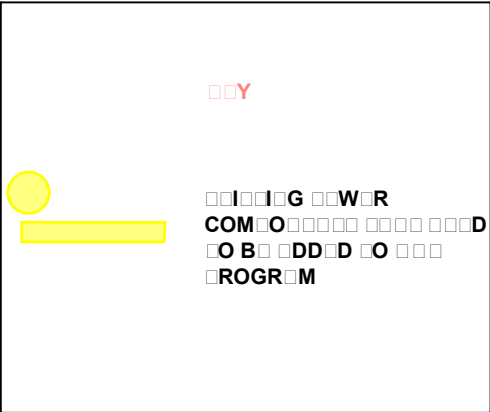
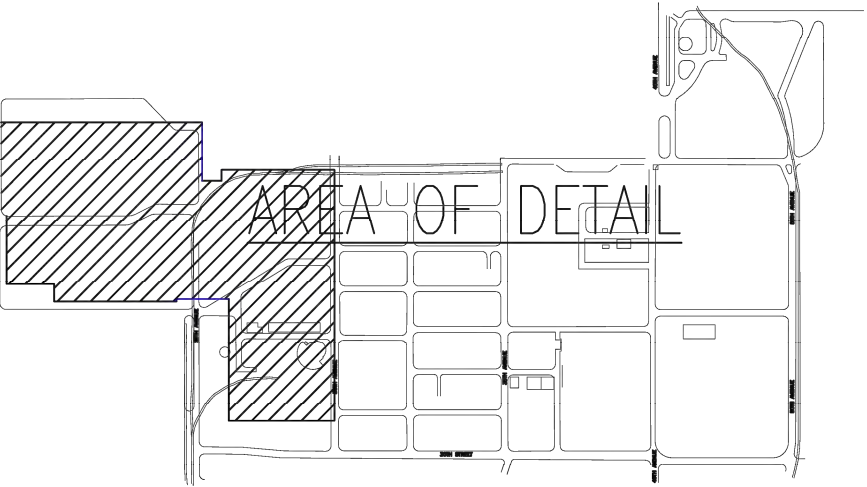
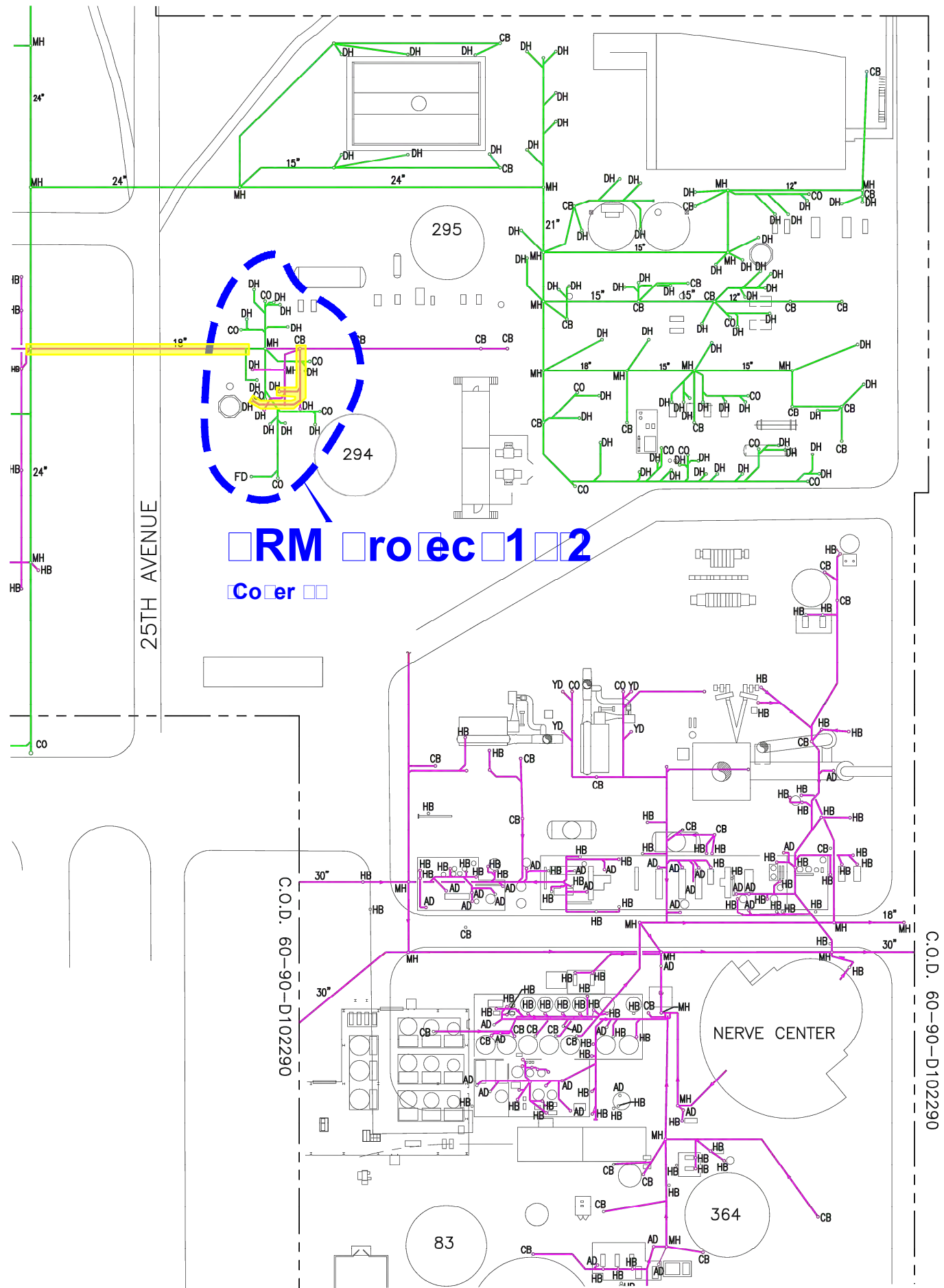


Figure B-1
RM rotec ll- Coer
NSPS Subpart QQQ Audit
BP Husky LLC - Toledo Refinery
Toledo, Ohio



LEGEND

- CATCH BASIN/HUB BASIN/AREA DRAIN/YARD DRAIN
- MANHOLE/SUMP/PIT/JUNCTION BOX/LIFT STATION
- ▲ PLUG
- ▼ REDUCER
- ⊗ VALVE
- DT DRAIN TILE
- IPV INDICATING POST VALVE
- WS WATER STRAINER
- AD AREA DRAIN
- CB CATCH BASIN
- DR DRAIN
- EMH ELECTRICAL MANHOLE
- HB HUB BASIN
- JB JUNCTION BOX
- LS LIFT STATION
- MH MANHOLE
- YD YARD DRAIN
- DH DRAIN HUB
- CO CLEAN OUT
- FD FLOOR DRAIN
- QQQ SEWER
- NON-QQQ SEWER
- ABANDONDED SEWER



Figure B-1 2B
RM ro ec II-1 2
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NSPS Subpart QQQ Audit
BP Husky LLC - Toledo Refinery
Toledo, Ohio

SOUR: PH Dra ing 60 0 D2000 rev
2 20 0 0 Se ers Underground Se er
S stem West TIU

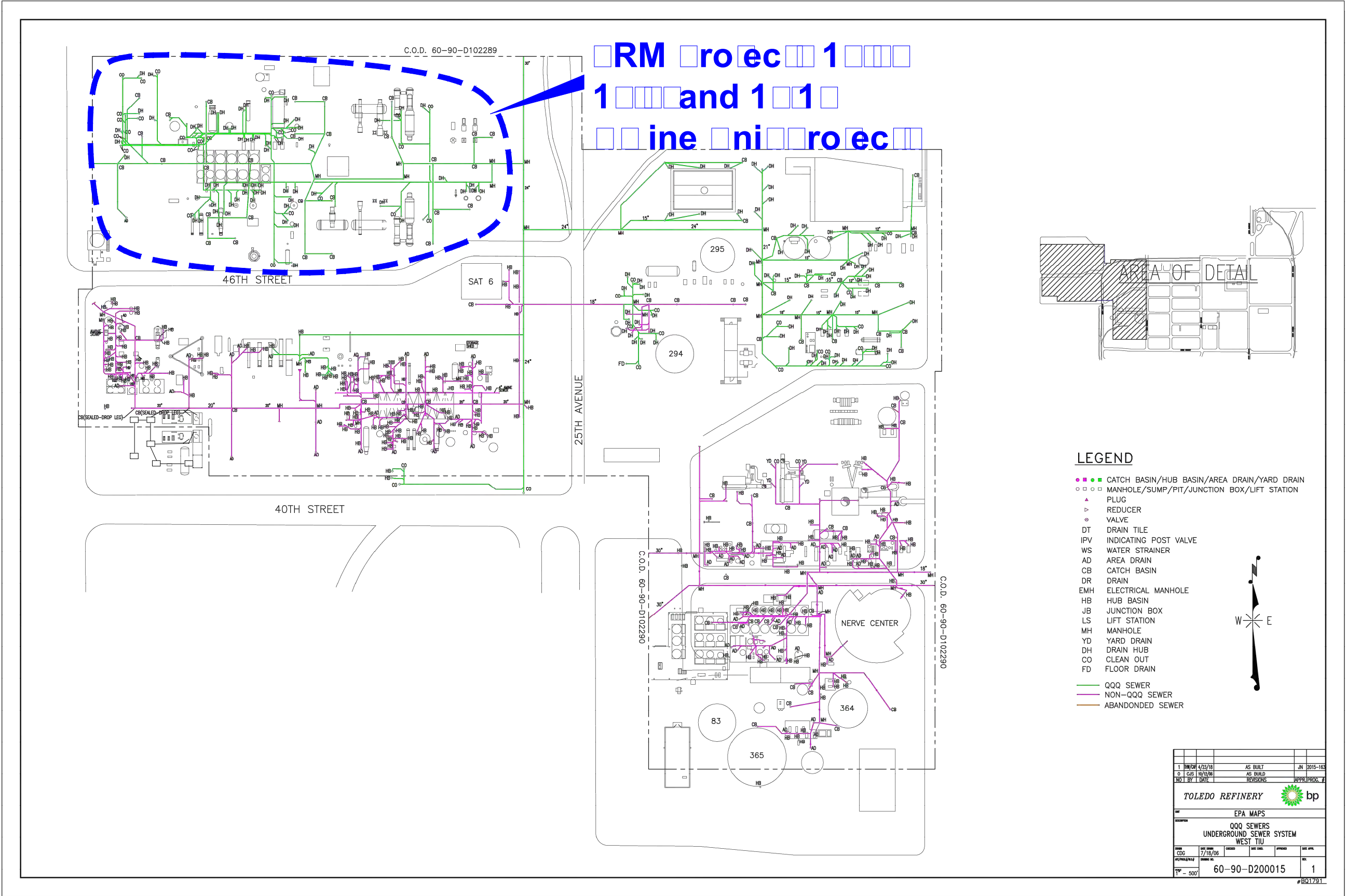


Figure B-1
RM Project 11-1 and 11-1
line in sewer Diagram
NSPS Subpart QQQ Audit
BP Husky LLC - Toledo Refinery
Toledo, Ohio

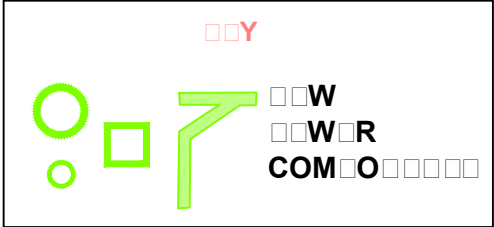
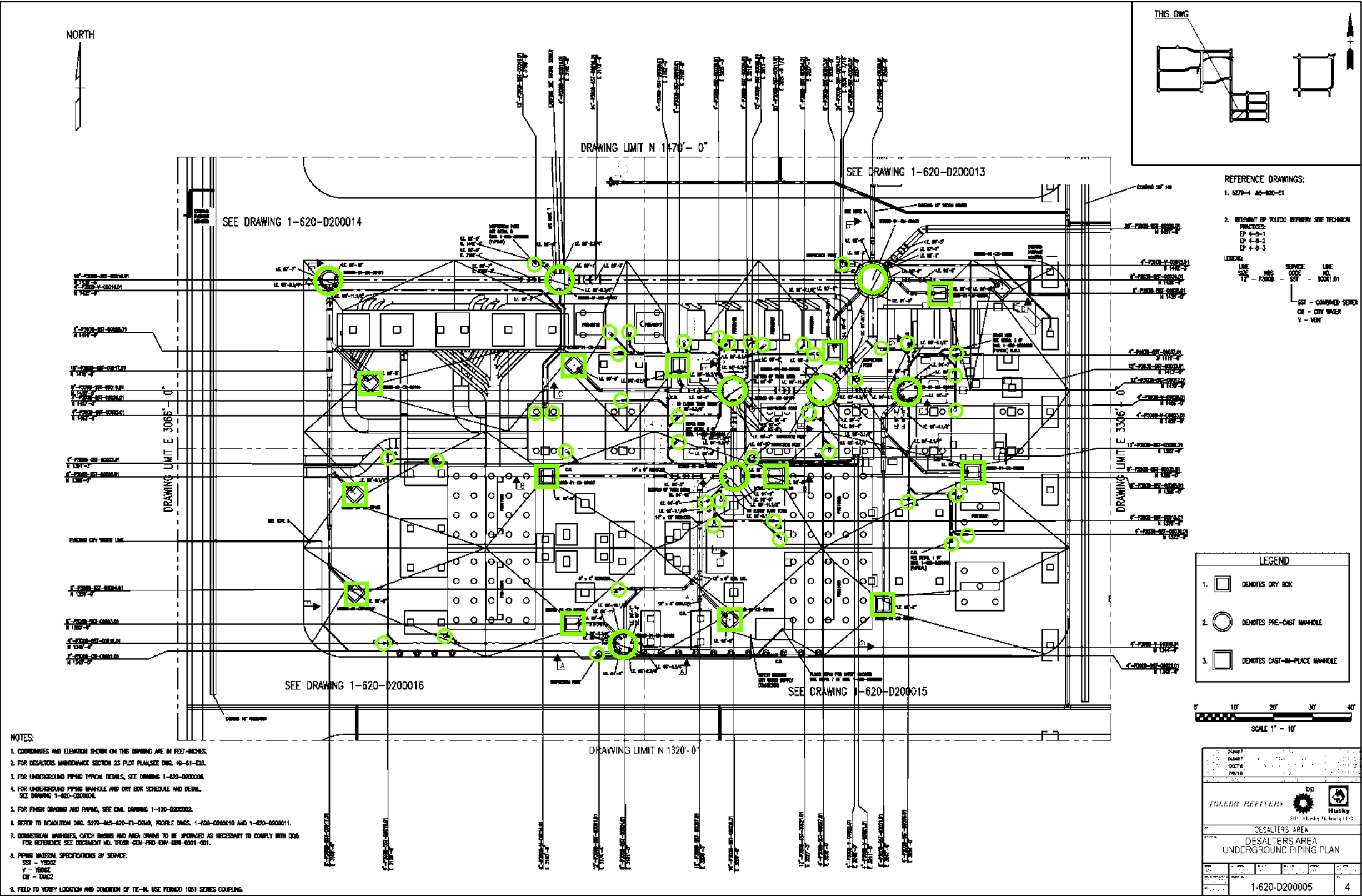
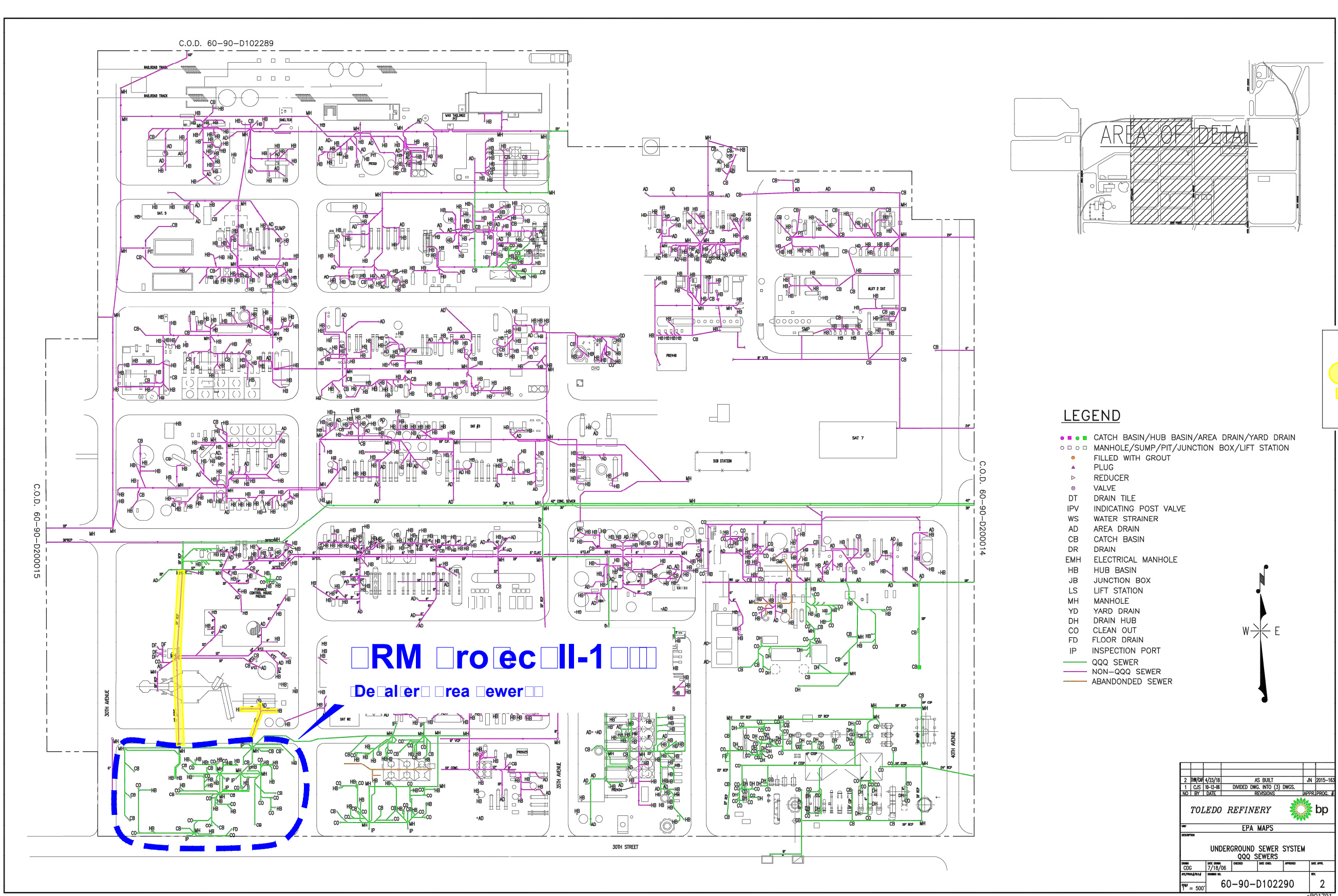


Figure B-1
RM ro.ec II-1
NSPS Subpart QQQ Audit
BP Husky LLC - Toledo Refinery
Toledo, Ohio



LEGEND

- CATCH BASIN/HUB BASIN/AREA DRAIN/YARD DRAIN
- MANHOLE/SUMP/PIT/JUNCTION BOX/LIFT STATION
- ▲ FILLED WITH GROUT
- ▲ PLUG
- ▲ REDUCER
- VALVE
- DT DRAIN TILE
- IPV INDICATING POST VALVE
- WS WATER STRAINER
- AD AREA DRAIN
- CB CATCH BASIN
- DR DRAIN
- EMH ELECTRICAL MANHOLE
- HB HUB BASIN
- JB JUNCTION BOX
- LS LIFT STATION
- MH MANHOLE
- YD YARD DRAIN
- DH DRAIN HUB
- CO CLEAN OUT
- FD FLOOR DRAIN
- IP INSPECTION PORT
- QQQ SEWER
- NON-XXX SEWER
- ABANDONED SEWER

Legend symbols for various sewer components, including a yellow circle and a yellow rectangle.

2	REVISED 4/23/18	AS BUILT	JN 2015-163
1	C/S 1 8-12-18	DIVIDED DWS. INTO (3) DWS.	REVISED
NO. 1	DATE		
TOLEDO REFINERY			
EPA MAPS			
UNDERGROUND SEWER SYSTEM			
QQQ SEWERS			
CDG	7/18/06	DATE	DATE
60-90-D102290	2		
#BQ1781			

Figure B-1 RM ro ec II-1 De al er rea ewer NSPS Subpart QQQ Audit BP Husky LLC - Toledo Refinery Toledo, Ohio

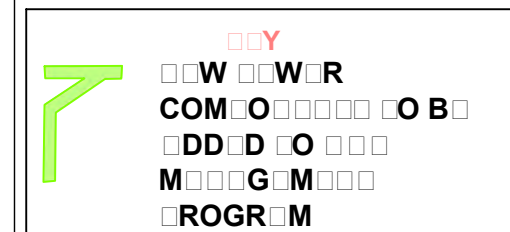


Figure B-1

RM rotec Il-1

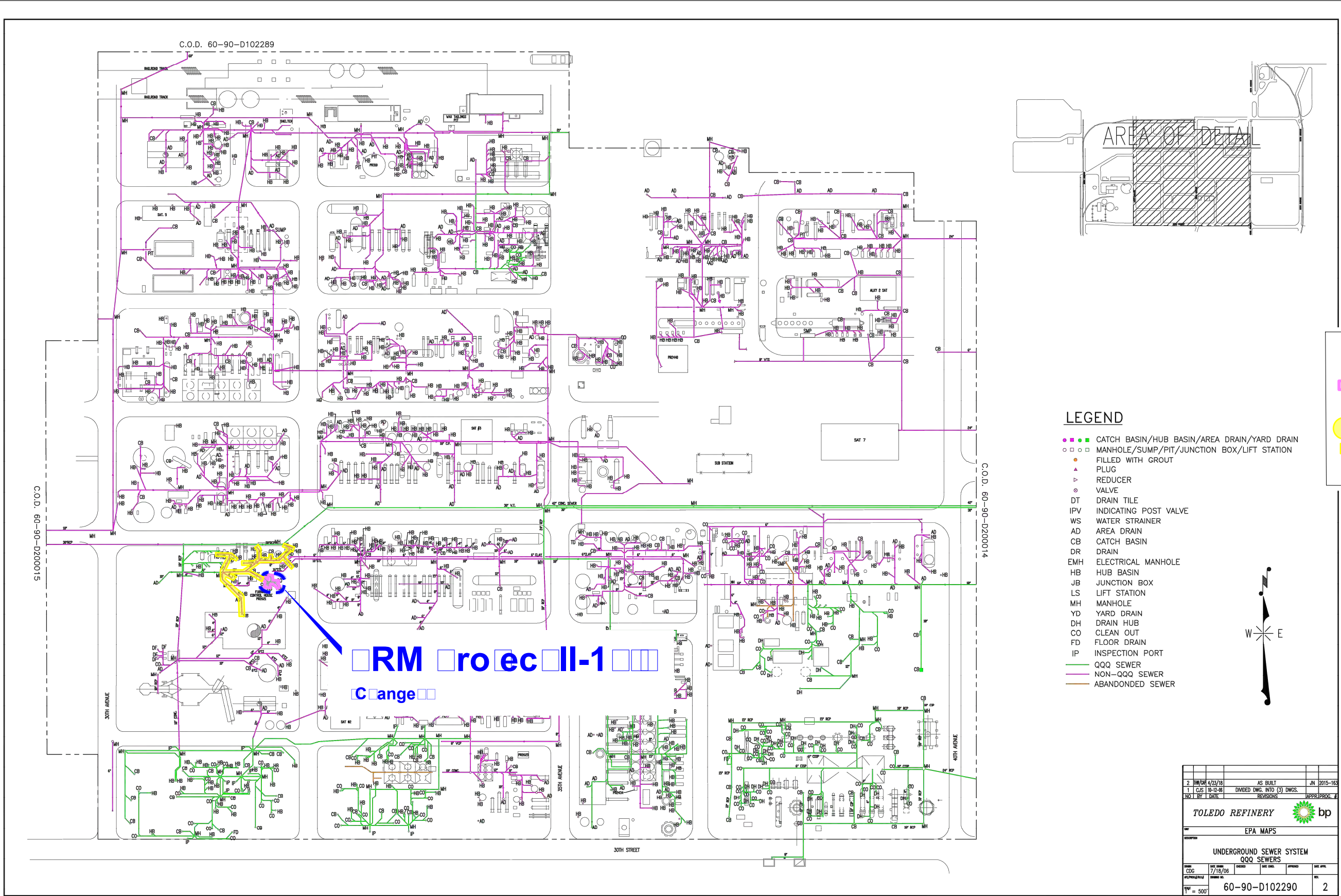
Crude 1 Dealter Make-up

Water

NSPS Subpart QQQ Audit

BP Husky LLC - Toledo Refinery

Toledo, Ohio



LEGEND

- CATCH BASIN/HUB BASIN/AREA DRAIN/YARD DRAIN
- MANHOLE/SUMP/PIT/JUNCTION BOX/LIFT STATION
- FILLED WITH GROUT
- PLUG
- REDUCER
- VALVE
- DT DRAIN TILE
- IPV INDICATING POST VALVE
- WS WATER STRAINER
- AD AREA DRAIN
- CB CATCH BASIN
- DR DRAIN
- EMH ELECTRICAL MANHOLE
- HB HUB BASIN
- JB JUNCTION BOX
- LS LIFT STATION
- MH MANHOLE
- YD YARD DRAIN
- DH DRAIN HUB
- CO CLEAN OUT
- FD FLOOR DRAIN
- IP INSPECTION PORT
- QQQ SEWER
- NON-QQQ SEWER
- ABANDONED SEWER

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2	HW/OW 4/23/18	AS BUILT	JN 2015-163
1	CS 1 8-12-18	DIVIDED DWS. INTO (3) DWS.	REVISIONS
NO. 1	BY DATE		APPRO. #
TOLEDO REFINERY			
EPA MAPS			
UNDERGROUND SEWER SYSTEM			
QQQ SEWERS			
DATE 7/18/06	DATE 7/18/06	DATE 7/18/06	DATE 7/18/06
60-90-D102290			2
1" = 500'			#BQ1791

Figure B-1 B

RM Project II-1

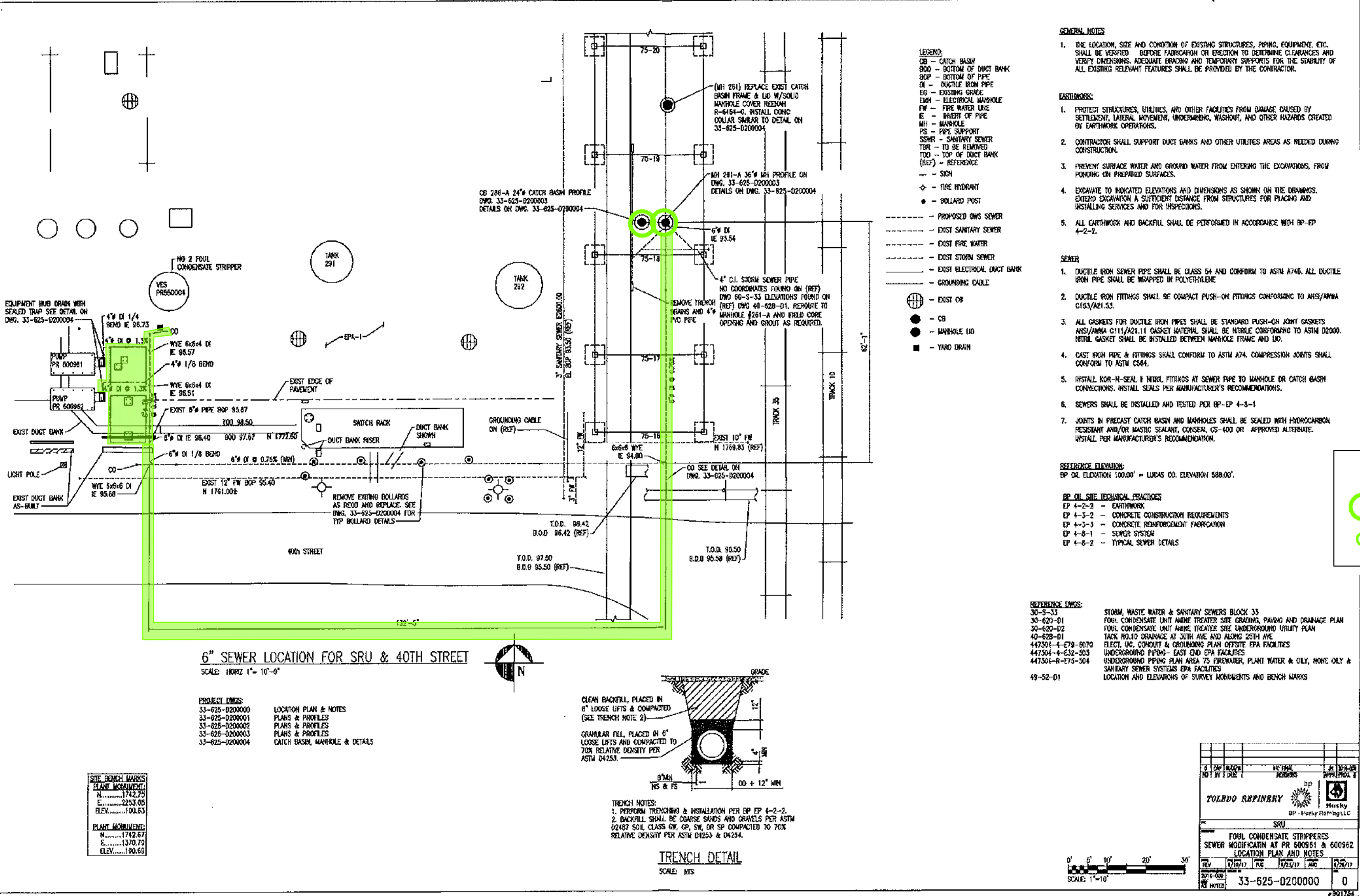
Change to Crude 1 Detailer

Make-up Water

NSPS Subpart QQQ Audit

BP Husky LLC - Toledo Refinery

Toledo, Ohio

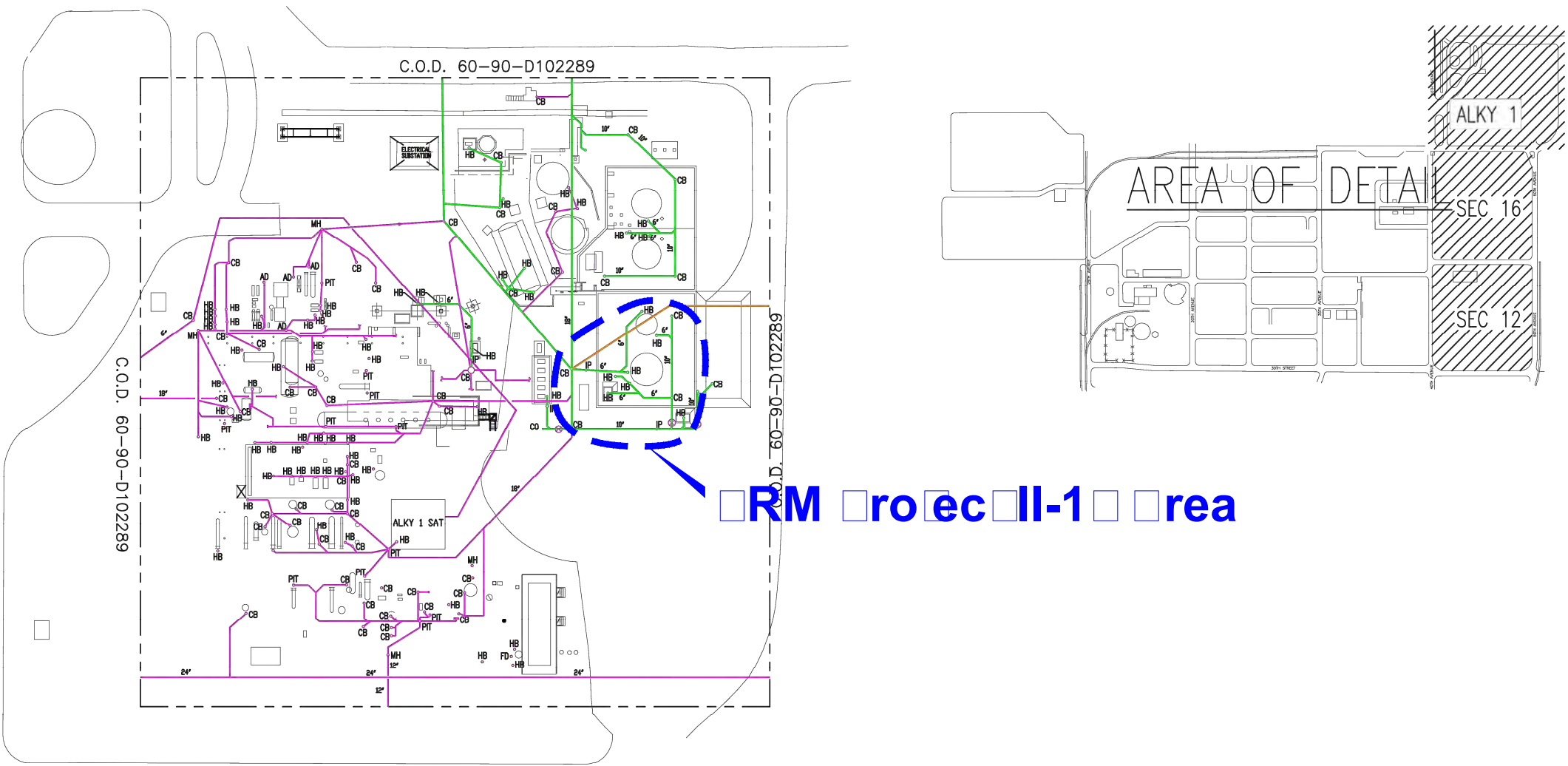


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Figure B-1
RM ro ec II-1
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NSPS Subpart QQQ Audit
BP Husky LLC - Toledo Refinery
Toledo, Ohio





ENLARGED PLAN ALKY 1 AREA

LEGEND

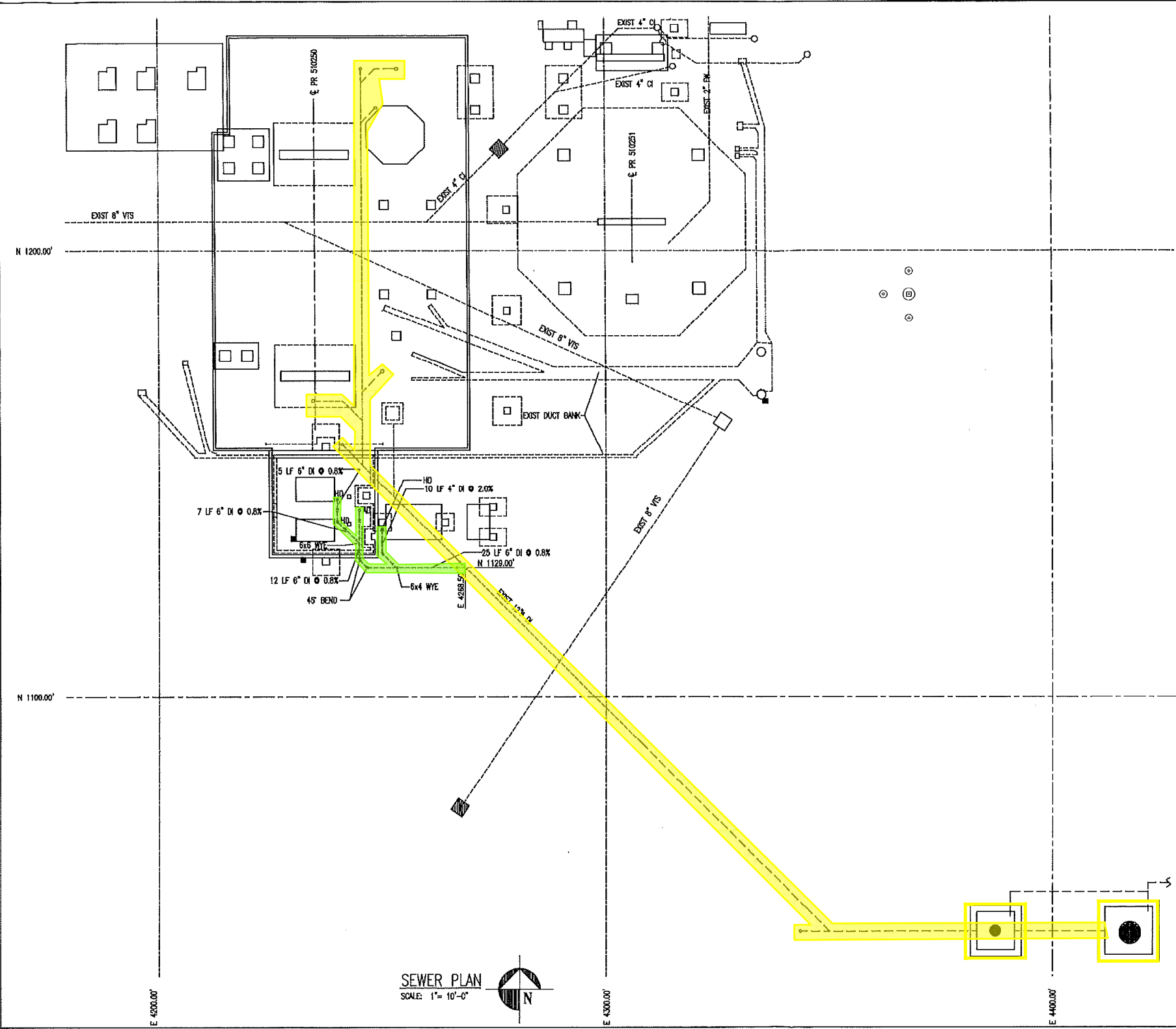
- ● ● CATCH BASIN/HUB BASIN/AREA DRAIN/YARD DRAIN
- ○ ○ MANHOLE/SUMP/PIT/JUNCTION BOX/LIFT STATION
- ▲ PLUG
- ▽ REDUCER
- ⊗ VALVE
- DT DRAIN TILE
- IPV INDICATING POST VALVE
- WS WATER STRAINER
- AD AREA DRAIN
- CB CATCH BASIN
- DR DRAIN
- EMH ELECTRICAL MANHOLE
- HB HUB BASIN
- JB JUNCTION BOX
- LS LIFT STATION
- MH MANHOLE
- YD YARD DRAIN
- DH DRAIN HUB
- CO CLEAN OUT
- FD FLOOR DRAIN
- IP INSPECTION PORT
- QQQ SEWER
- NON-QQQ SEWER
- ABANDONED SEWER



SOUR: PH Drawing 60-90-D2000 rev 2
20 (Underground Sewer System)
East Area)

Figure B-1
RM Project II-1
Alky 1 Caulic Storage Tank
NSPS Subpart QQQ Audit
BP Husky LLC - Toledo Refinery
Toledo, Ohio





- GENERAL NOTES:**
- 1. SEE DWG 21-51-D200002 FOR SITE PLAN AND GENERAL NOTES.
 - 2. ALL SOIL EXCAVATED DURING THIS PROJECT SHALL BE INSPECTED FOR OIL & CONTAMINANTS BY BP WASTE SPECIALISTS. ANY SOIL FOUND TO CONTAIN OIL OR CONTAMINANTS SHALL BE DISPOSED OF AS DIRECTED BY THE BP ENGINEER. ALL OTHER SOIL SHALL BE FIRST USED TO FILL LOW SPOTS.
 - 3. ELEVATIONS ON DRAWING ARE LUCAS COUNTY DATUM AND ARE EQUIVALENT TO NAVD88+1.44'.
 - 4. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ALL EXISTING CONDITIONS PRIOR TO CONSTRUCTION.
 - 5. CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT OHIO UPS & GPRS PRIOR TO CONSTRUCTION.
 - 6. CONTRACTOR SHALL REGRADE AREA TO MATCH EXISTING DRAINAGE.
- SEWER**
- DUCTILE IRON PIPE:
- 1. DUCTILE IRON SEWER PIPE SHALL BE CLASS 52 AND CONFORM TO ASTM A746
 - 2. ALL DUCTILE IRON FITTINGS SHALL BE COMPACT PUSH ON FITTINGS CONFORMING TO AWWA C115.
 - 3. ALL GASKETS SHALL BE NITRILE (NBR/BUNA-N) CONFORMING TO ASTM D2000
 - 4. ALL DUCTILE IRON PIPE SHALL BE WRAPPED IN POLYETHYLENE
- LEGEND:**
- HD - HUB DRAIN
AD - AREA DRAIN
- BP OIL SITE TECHNICAL PRACTICES:**
- EP 4-8-1 - SEWER SYSTEMS
 - EP 4-8-2 - TYPICAL SEWER DETAILS
 - EP 4-8-2 - TYPICAL SEWER SYSTEMS

Y

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W W R C O O O O O
O B D D O O O
R O G R A M

SEE DWG 22-51-D200002 FOR GENERAL NOTES

NO	BY	DATE	ISSUED FOR CONSTRUCTION	REVISED	FILE
1		12/5/19	ISSUED FOR CONSTRUCTION		2019-200
TOLEDO REFINERY					
BP - Husky Refining LLC					
COOLING TOWERS AND FLARE STACKS					
EAST FLARE KO DRUM PUMPS					
SEWER PLAN					
AND GENERAL NOTES					
NO	BY	DATE	ISSUED FOR CONSTRUCTION	REVISED	FILE
1		12/5/19	ISSUED FOR CONSTRUCTION		2019-200
22-631-D200001					
B					

Figure B-1

RM ro ec II-1

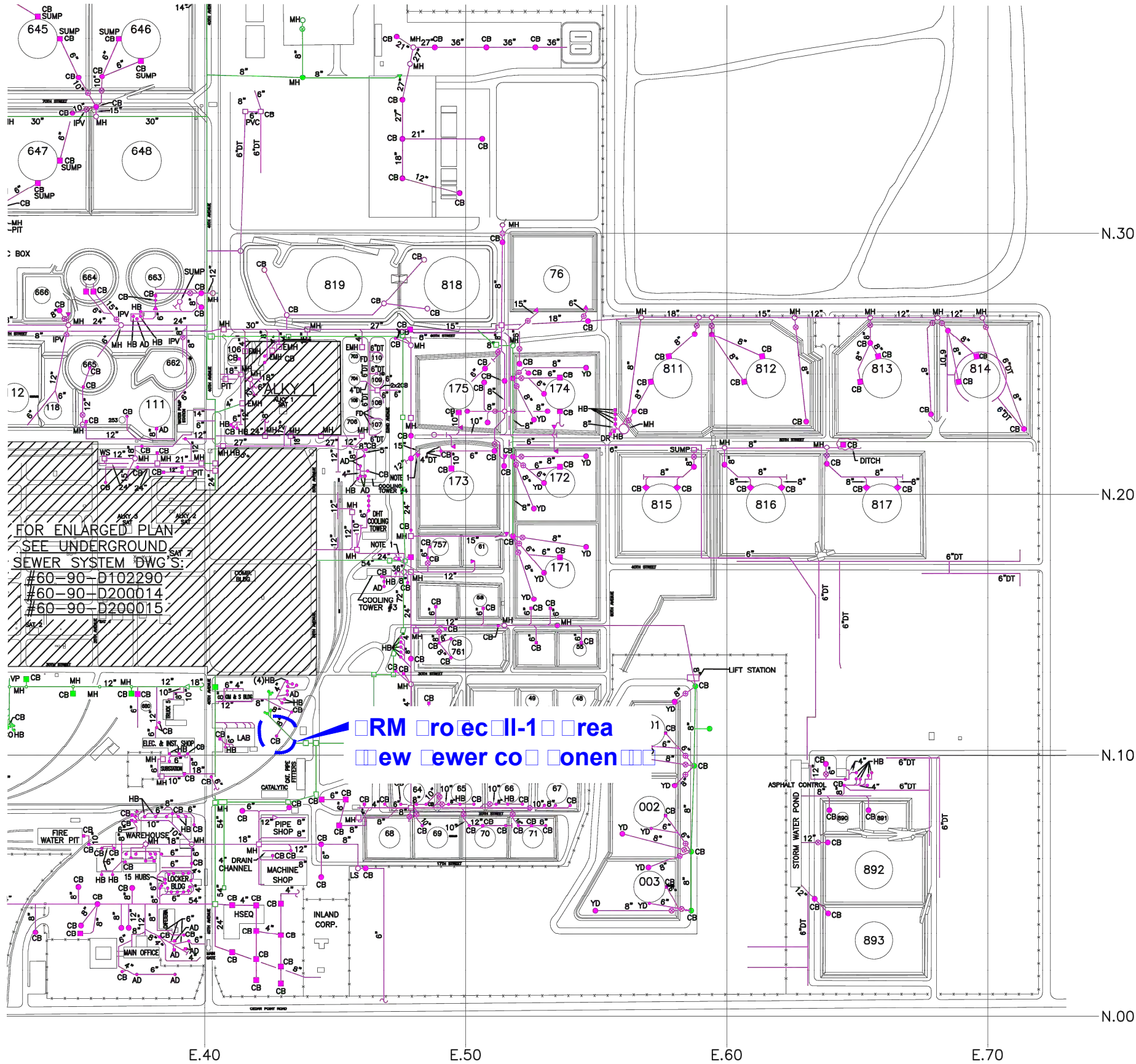
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NSPS Subpart QQQ Audit

BP Husky LLC - Toledo Refinery

Toledo, Ohio



NOTES

1. SEWER IS PLUGGED WITH A HEAVY SLUDGE.

LEGEND

- CATCH BASIN/HUB BASIN/AREA DRAIN/YARD DRAIN
- MANHOLE/SUMP/PIT/JUNCTION BOX/LIFT STATION
- PLUG
- REDUCER
- VALVE
- DT DRAIN TILE
- IPV INDICATING POST VALVE
- WS WATER STRAINER
- AD AREA DRAIN
- CB CATCH BASIN
- CO CLEANOUT
- DR DRAIN
- EMH ELECTRICAL MANHOLE
- HB HUB BASIN
- JB JUNCTION BOX
- LS LIFT STATION
- MH MANHOLE
- YD YARD DRAIN
- CV CHECK VALVE
- FD FRENCH DRAIN
- DI DUCTILE IRON
- VP VENT PIPE
- QQQ SEWER
- NON-QQQ SEWER
- ABANDONED SEWER

4	ARV	1/7/09	CORRECTIONS PER BP COMMENTS		
3	CJS	10/12/06	UPDATED UNDERGROUND LINES		
2	MDD	7/06	REVISED SEWER LINES		
5	THW/CH	4/23/18	AS BUILT	JN	2015-163
NO	BY	DATE	REVISIONS	APPR.	PROG. #
TOLEDO REFINERY					
EPA MAPS					
DESCRIPTION					
QQQ SEWERS UNDERGROUND SEWER SYSTEM					
DRAWN	DATE DRAWN	CHECKED	DATE CHD.	APPROVED	DATE APPL.
	1/16/95				
REV/PROG.#/NO.	DRAWING NO.				REV.
	60-90-D102289				5
SCALE					
1" = 300'					

Figure B-1 **RM ro ec ll-1 rea**
ew ewer co onen
NSPS Subpart QQQ Audit
BP Husky LLC - Toledo Refinery
Toledo, Ohio

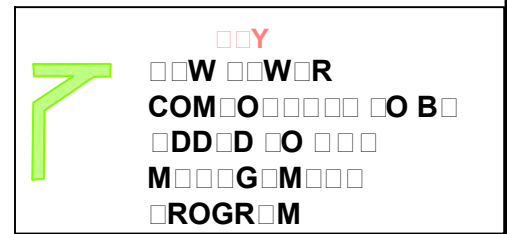


Figure B-1
RM roec ll-1
 NSPS Subpart QQQ Audit
 BP Husky LLC - Toledo Refinery
 Toledo, Ohio



APPENDIX C QQQ SEWER DIAGRAMS

April 2020



Figure C-1
□□□□ sewer □
NSPS Subpart QQQ Audit
BP Husky LLC - Toledo Refinery
Toledo, Ohio

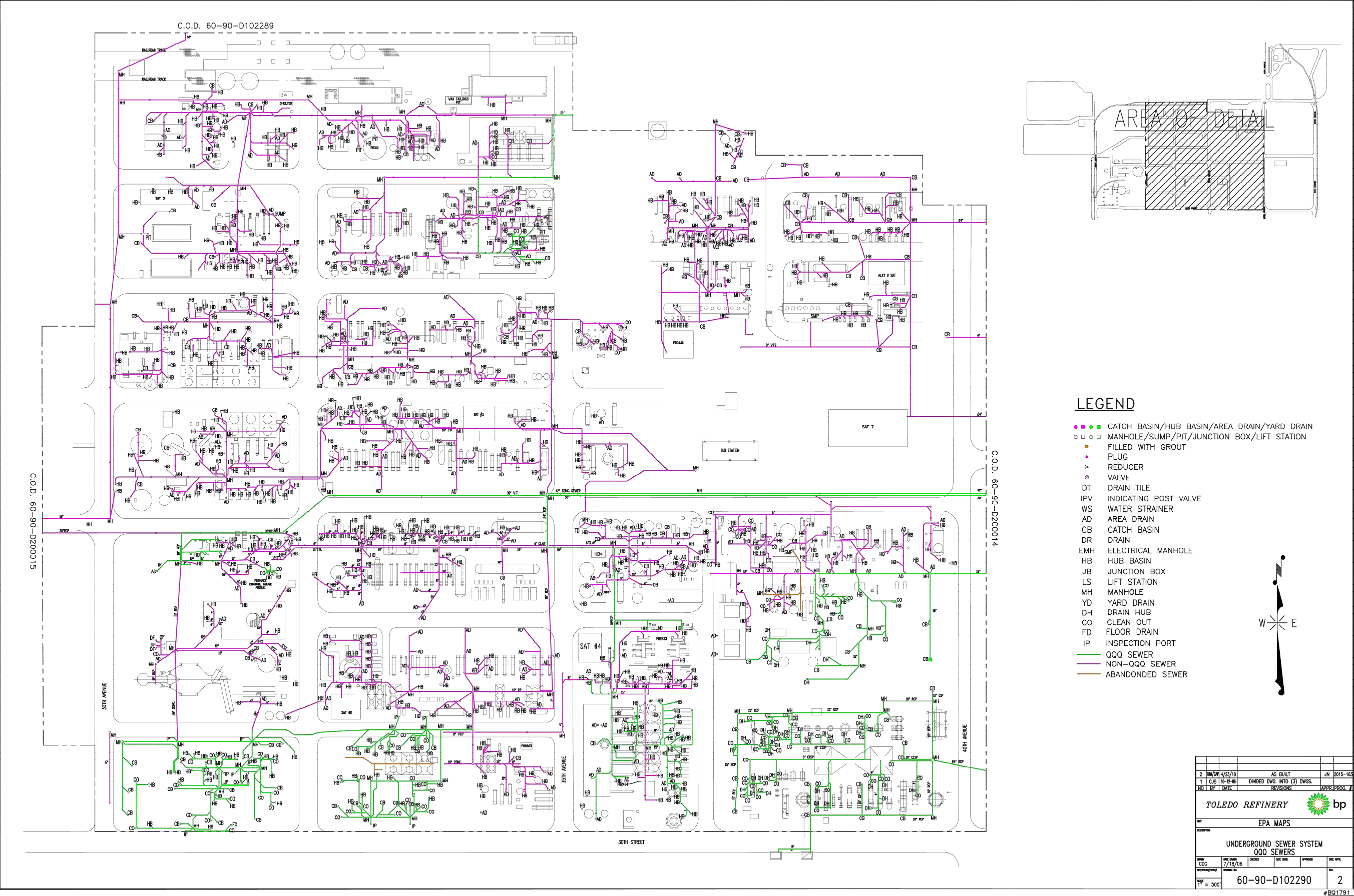
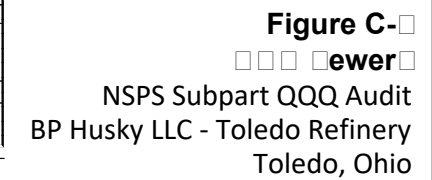


Figure C-2

sewer

NSPS Subpart QQQ Audit
BP Husky LLC - Toledo Refinery
Toledo, Ohio



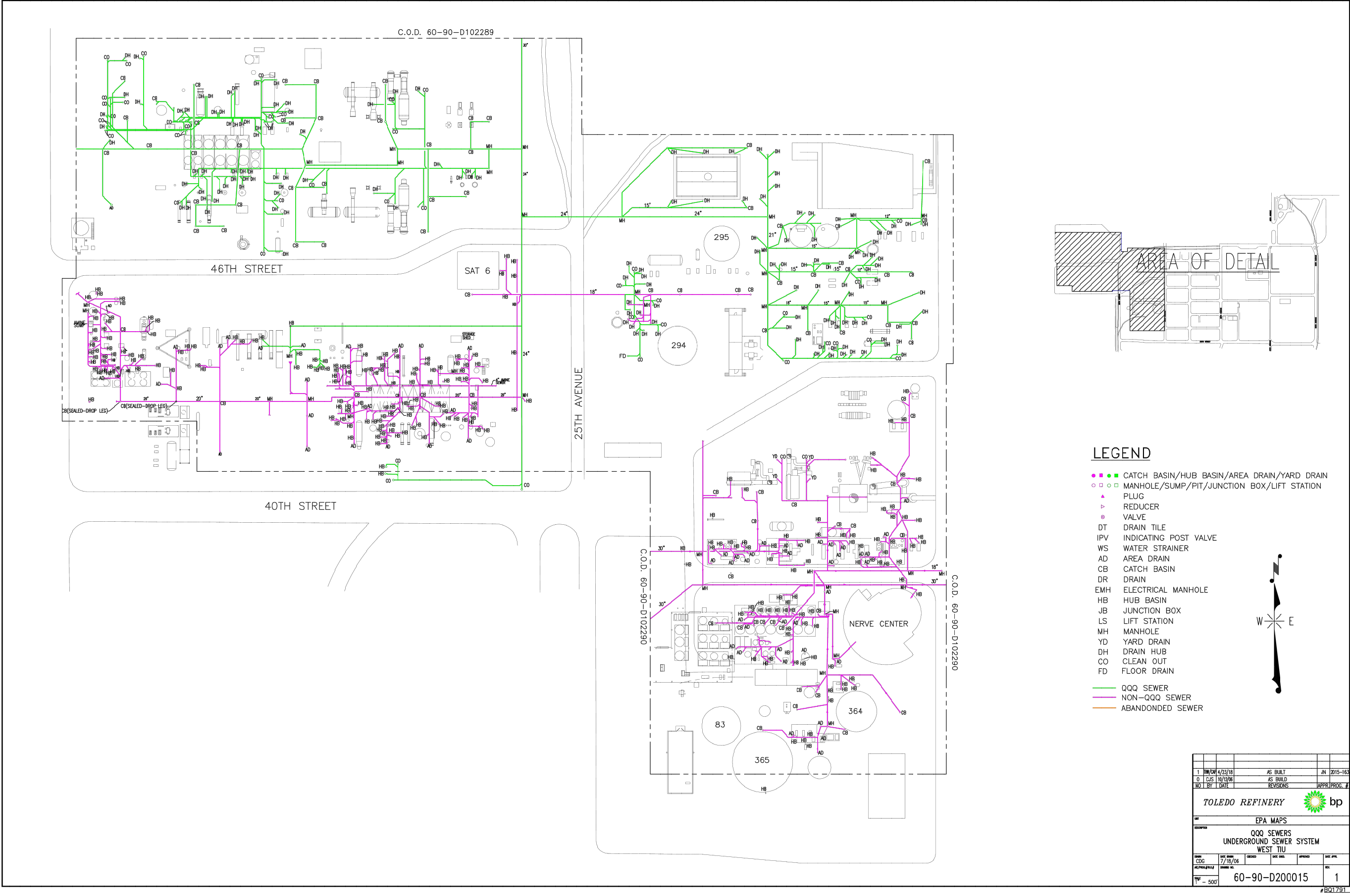


Figure C-

sewer

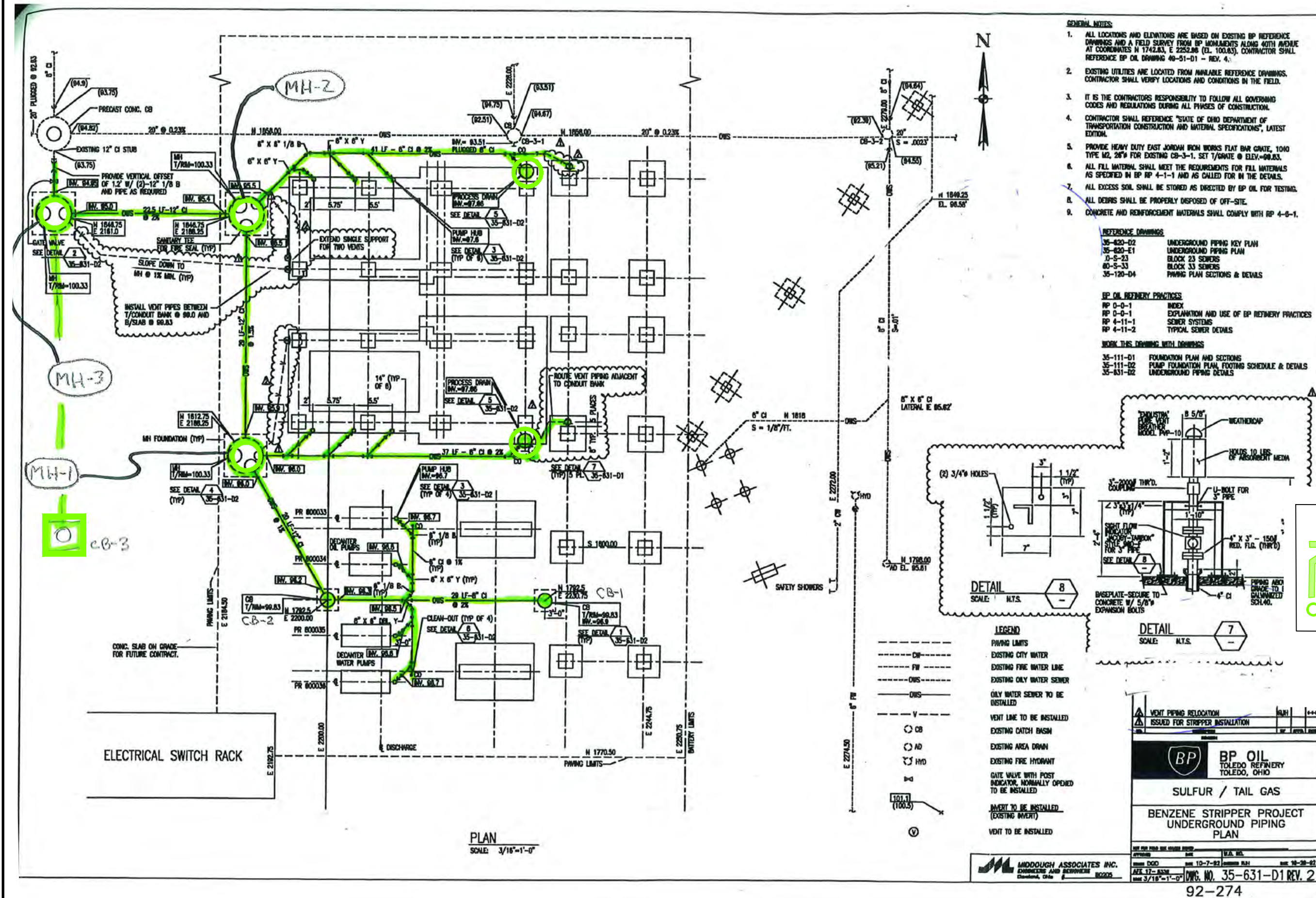
NSPS Subpart QQQ Audit

BP Husky LLC - Toledo Refinery

Toledo, Ohio

APPENDIX D BENZENE STRIPPER PROJECT SEWER CHANGES (CIRCA JANUARY 1993)

April 2020



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ROGR M

Figure D-1

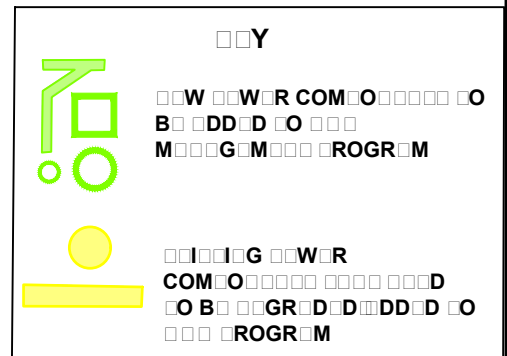
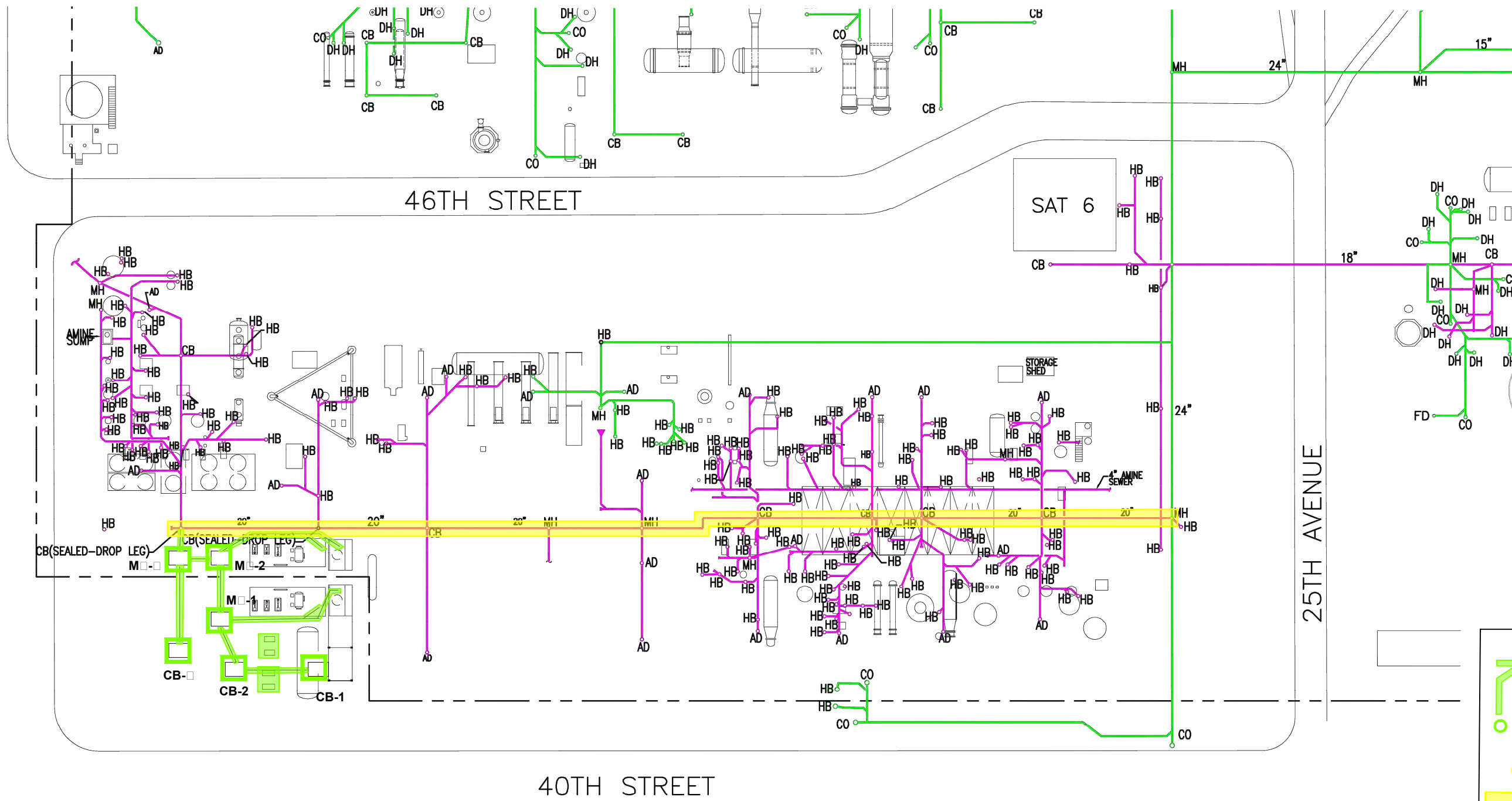
RM roec II-1

Ben ene ri er roec

NSPS Subpart QQQ Audit

BP Husky LLC - Toledo Refinery

Toledo, Ohio



C.O.D. 60-90-D1022

SOUR: PH Drawing 600D2000 rev
20" Seers Underground Seer
System West TIU

Figure D-2
RM roec II-1
Benene ri er roec
NSPS Subpart QQQ Audit
BP Husky LLC - Toledo Refinery
Toledo, Ohio



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Hong Kong	South Africa
India	South Korea
Indonesia	Spain
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Kazakhstan	Tanzania
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